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TRANSACTIONS

OF THE

British Congress on Tuberculosis

FOR THE PREVENTION OF CONSUMPTION.

LONDON, JULY 22nd to 26th, 1901.

Patron:
HIS MAJESTY THE KING.

President:
FIELD-MARSHAL H.R.H. THE DUKE OF CAMBRIDGE, K.G.

VOLUME I.

LIBRARY

GENERAL MEETINGS,
LISTS OF OFFICERS OF THE CONGRESS,
COMMITTEES, DELEGATES
AND
SUBSCRIBERS.

EDITED BY THE HONORARY SECRETARY-GENERAL.

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THE OFFICERS AND EXECUTIVE

OF THE

British Congress on Tuberculosis.

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GENERAL MEETINGS.

16

Opening Ceremony.

The Opening Ceremony was held in St. James's Hall, on Monday, July 22nd, 1901; FIELD-MARSHAL H.R.H. THE DUKE OF CAMBRIDGE, K.G., took the Chair at 3 P.M.; the hall was filled to overflowing by a number of distinguished people.

H.R.H. THE DUKE OF CAMBRIDGE, K.G., rising to open the meeting, said: I will first request the Honorary Secretary-General to read the names of those unable to attend.

THE HONORARY SECRETARY (MR. MALCOLM MORRIS) announced that he had received letters and telegrams from certain distinguished people who were unable to be present, but who sympathised with the work of the Congress. They were as follows:—The Russian, German, and Austrian Ambassadors; the Dukes of Ratibor (Germany), Fife, Portland, and Sutherland; the Earl of Hardwicke; the Marquesses of Dufferin and Ava, and Northampton; Viscount Templetown; Lords Alverstone, George Hamilton, Iveagh, and Rothschild; Sir John Burdon Sanderson, Sir Ernest Cassel, and the Right Honourable Joseph Chamberlain, and others.

THE HONORARY SECRETARY-GENERAL next read the following report:—

YOUR ROYAL HIGHNESS,—

At your command we have the honour to report to you the history and programme of the British Congress on Tuberculosis.

Berlin Congress.

The movement may be said to have originated at the German Congress on Tuberculosis held in Berlin in May, 1899, when representations were made to the British delegates as to the desirability of holding a Congress in London. Some of these delegates had been appointed by His Royal Highness the Prince of Wales to represent the National Association for the Prevention of Consumption, of which His Royal Highness was the President. The delegates reported the matter to the Council of the Association.

As one of the objects of the Association is the promotion of Congresses, it was resolved to take the necessary initiatory steps. The Council in the first instance approached H.R.H. the Prince of Wales, who not only gave his approval and consent, but also most graciously consented to become President of the Congress and to open it in person.

Date of Congress.

In compliance with the wishes of His Royal Highness, the date of the Congress had originally been fixed for the 22nd of April of this year. In January, however, we, in common with the whole world, mourned the death of our beloved Queen Victoria, and all preparations were for the time being at a standstill. Subsequently the date of the opening of the Congress was postponed to the 22nd July.

Royal Patronage.

On the accession of His Royal Highness to the Throne, we received an intimation that although His Majesty the King would be unable to take any part in the opening ceremony, His Majesty would be most graciously pleased to be Patron of the Congress. We venture to think that all the members of the Congress will gratefully recognise the deep interest which from the very first our august Sovereign has taken in this question, which so vitally affects not only the health of this nation, but the inhabitants of the whole world.

Your Royal Highness, at the request of His Majesty the King, graciously has undertaken to fill the office of President of the Congress and to preside at this meeting. The Council desire to tender to your Royal Highness their sincere thanks for your presence here to-day.

Preliminary Meeting.

The Association next proceeded to summon a Preliminary Meeting for the purpose of enlisting support in the undertaking, and over 3,000 invitations were sent to the principal medical, sanitary, educational, and agricultural institutions of the United Kingdom, as well as to Lord-Lieutenants of Counties, Mayors of Corporations, and other representative persons. The meeting was held on the 18th December, 1899, in Gray's Inn Hall.

Resolution.

A large number were present, and a resolution was passed as follows :—

"This meeting is unanimously of opinion that it is desirable to hold a National Congress on Tuberculosis in 1901, to which representatives from India and all Dependencies of the Empire should be invited, and, in addition, delegates from other countries."

It is unnecessary to quote here the other resolutions passed on this occasion, which included the nomination of an Organising Council. The Earl of Derby, in response to the wishes of the meeting, kindly consented to be the president of that Council. Sir William Broadbent was appointed chairman of the Council, and Mr. Malcolm Morris Hon. Secretary General of the Congress.

Appointment of Officers.

Lord Avebury and Sir James Blyth were subsequently invited to act as Honorary Treasurers, and it is largely due to their able help and administration that we have been able to raise the necessary funds.

Appointment of Committees.

The following Committees were also appointed :—

A General Purposes Committee, of which Professor Clifford Allbutt consented to act as chairman.

A Finance Committee, of which Sir James Blyth consented to be chairman, while Mr. White Wallis undertook the supervision of the accounts and the position of hon. auditor.

A Reception Committee, of which Sir James Crichton Browne wa appointed chairman, and Dr. Hillier hon. secretary, and Dr. Irwin Moore as assistant hon. secretary.

A Museum Committee, of which Professor Sims Woodhead consented to act as chairman, and Dr. Jobson Horne as hon. secretary, with Mr. Thomas Cutler as hon. secretary to the Architectural Section.

Subsequently, at the request of the Council, Dr. StClair Thomson undertook to act as Hon. Foreign Secretary.

To the work of the above-mentioned gentlemen the organisation of the Congress is due. They have performed their voluntary labours with great devotion and energy.

Government Offices.

We have pleasure in acknowledging that we have received every possible assistance from the Foreign, Colonial, and India Offices.

Foreign Office.

The Minister of Foreign Affairs, Lord Lansdowne, not only undertook to forward letters of invitation to the respective Governments in Europe and America, but added :—

"An intimation will at the same time be given that, although the Congress is not promoted by Her Majesty's Government, they take a great interest in the objects for which it is being summoned, and would learn with pleasure that the invitations had been accepted."

Accordingly, we have the great pleasure to welcome to-day gentlemen who have been commissioned by many foreign Governments to attend the Congress and report its proceedings.

Colonial Office.

Mr. Chamberlain, as Secretary of State for the Colonies, has also rendered this Congress signal service, and our invitations have been forwarded under his covering despatch to all the Colonies and Dependencies of the Empire, which have also sent delegates to attend the Congress.

India Office.

The India Office has also officially forwarded our communications to the Presidencies and States of India, several of which have sent delegates.

In addition to these, various medical societies, both of the Continent of

Europe and America, the principal corporations, associations, and societies in the United Kingdom, have sent delegates. The presence of all these delegates will enhance the importance and add to the value of the scientific work of the Congress.

General Purposes Committee.

On March 29th, 1900, the General Purposes Committee met for the purpose of framing the regulations and arranging the programme.

Sections.

It was resolved to divide the work of the Congress into four sections.

Of the First Section—State and Municipal—the Right Hon. Sir Herbert Maxwell, M.P., is president. We are indebted to the officers of the section, and to the hon. secretaries, Dr. Bulstrode and Dr. Niven (Manchester), and Dr. Newsholme (Brighton), for the comprehensive programme they have drawn up.

In Section II.—Medical, including Climatology and Sanatoria—we are fortunate in having as president Sir R. Douglas Powell; and as hon. secretaries we have had the advantage of the services of Dr. Hector Mackenzie, Sir Hugh Beevor, Dr. R. W. Philip (Edinburgh), and Dr. William Calwell (Belfast).

Section III.—Pathology, including Bacteriology—is presided over by Professor Sims Woodhead, whose name is a household word among pathologists. He has had the valuable assistance of Dr. Wethered, Dr. Perkins, Professor Rubert Boyce (Liverpool), and Dr. McWeeney (Dublin), as hon. secretaries.

Section IV.—Veterinary (Tuberculosis in Animals)—has that distinguished authority on that subject, Sir George Brown, C.B., as its president.

We are much indebted to the hon. secretaries, Prof. Hobday, Prof. Bradley (Edinburgh), and Prof. Woodruff, for their valuable services.

Museum.

A Museum has been arranged in the smaller hall attached to the Queen's Hall, to which the members of the Congress have the privilege of free admission on presenting their membership card. The Museum is divided into two sections :—

Section I.—Pathological and bacteriological preparations and specimens illustrating tuberculosis in man and animals.

Section II.—Plans and models of hospitals and sanatoria, charts and documents bearing upon the historical, geographical, and statistical aspects of the subject.

In the former of these sections a collection of exhibits of great scientific interest has been formed, full particulars of which are contained in the official catalogue. In expressing the thanks of the Council to those who have so kindly lent their specimens, it should be stated that no effort has been spared

by the honorary secretary, Dr. Jobson Horne, to make the Museum as complete as possible. It contains exhibits illustrating every known form of tuberculosis, both in man and in animals. We have to thank Dr. Jobson Horne, not only for collecting and classifying the specimens, but also for preparing a complete catalogue.

Museum, Section II.

Our thanks are also due to Mr. Thomas Cutler, first, for collecting and arranging the exhibits in Section II. of the Museum; secondly, for the design of the Congress ticket and the maps contained in it; thirdly, for the badge which has been presented to every member.

Finance Committee.

As soon as the Organising Council and General Purposes Committee had completed the preliminary arrangements, the Finance Committee undertook the task of obtaining subscriptions, and the Committee largely owe their success in this matter to the energies of their chairman, Sir James Blyth.

We have been supported by generous donations from the Corporations of London, Edinburgh, Liverpool, Manchester, and many other corporative bodies; also from the British Medical Association and other societies.

Private donors have given liberally towards the expenses of the Congress.

Distribution of Circulars, etc.

In order to make the objects of the Congress fully known, programmes and circulars were sent to leading representatives of Medical, Sanitary, and Veterinary Science, and to prominent persons in other departments of Science, of Agriculture, of Architecture, of Education, of Commerce, and of Philanthropy. Full information was also forwarded to the Mayors of all the principal Corporations and Boroughs in the United Kingdom, to the Metropolitan Borough Councils, to the Chairmen of County Councils of the United Kingdom, to Boards of Guardians; to the medical departments of the Army and Navy, to the medical staff of Hospitals dealing with diseases of the chest, and also to all large Hospitals in the Kingdom. Circulars were sent to almost all the Medical Officers of Health, and 10,172 were addressed to the Medical Men in Great Britain. Three thousand were sent to members of the Veterinary profession, and through the kindness of Mr. White Wallis, secretary of the Sanitary Institute, 2,400 were addressed to the members of that body.

Similar communications were sent to all the Universities of the United Kingdom, to the General Secretary of the British Medical Association, and to the Hon. Secretaries of its various branches; to the branches of the National Association for the Prevention of Consumption, to members of the Faculty of Actuaries, to Insurance Companies, to the various Friendly Societies in Great Britain, to the principal Medical, Agricultural, Commercial, and Philanthropic

Associations, to the principal Banks and Employers of Labour. In the United Kingdom alone some 38,000 circulars were distributed.

We have also done our utmost to inform all Colonies and Dependencies of the objects of the Congress and to invite their participation.

Foreign Countries.

Dr. StClair Thomson, the Hon. Foreign Secretary, to whose labours we are so deeply indebted, has sent circulars to Universities, Colleges, Official Bodies, Representative Men, Medical Societies in America, Austria, Belgium, Denmark, Egypt, France, Germany, Hungary, Holland, Italy, Japan, Norway, Poland, Portugal, Russia, Spain, Sweden, and Switzerland.

In Berlin a Committee has been formed under the presidency of His Serene Highness the Duke of Ratibor, with Dr. P. Jacob as hon. secretary. This Committee undertook the task of translating our circulars and of distributing information throughout Germany as to the objects of the Congress, and also of making all the necessary arrangements for the enrolment of members.

In Paris, as the result of a visit paid by Mr. Harold Swithinbank, a similar Committee was formed, under the chairmanship of Professor Brouardel, with Dr. Thoinot as hon. secretary. We wish to take this opportunity of conveying to the members of both these Committees the expression of our sincere thanks for their cordial co-operation, which enables us to welcome here to-day a large number of distinguished visitors.

Addresses.

During the Congress we shall have the privilege of listening to addresses from distinguished scientists at general meetings of the Congress.

The first of these will be delivered to-morrow in this Hall at 3 P.M. by Professor Koch, whose discovery of the *Bacillus tuberculosis* has placed the whole subject on a scientific basis. Lord Lister, F.R.S., has consented to take the chair on the occasion.

On Wednesday afternoon, at 3 P.M., in this Hall, Professor Brouardel, the Dean of the Faculty of Medicine of the University of Paris, who has done so much to bring into prominence the international relations of hygiene, will address us. The chair at this meeting will be taken by the Rt. Hon. Henry Chaplin, M.P.

On Thursday afternoon, at 3 o'clock, in the Queen's Hall, an address will be delivered by Professor McFadyean, of the Royal Veterinary College, and Lord Spencer, who has so keenly interested himself on the subject of arresting tuberculosis amongst cattle, has promised to be chairman.

On Friday afternoon, at the same hour, and in the same Hall, Lord Derby will preside over the Final General Meeting of the Congress, at which there will be submitted certain practical resolutions arising out of the discussions and proposals that have been before the various sections.

Reception Committee.

Mention must be made of the work of the Reception Committee. The special thanks of the Congress are due to Dr. Hillier, who has spared neither time nor trouble in arranging an attractive programme of entertainments. In this task he has been ably assisted by Dr. Irwin Moore.

We also wish to express our sincere gratitude to the Countess of Derby, the president, Miss Lankester, the hon. sec., and the members of the Ladies' Committee, who have spared no pains to provide for the entertainment of ladies accompanying members of the Congress.

The CHAIRMAN, who was received with great applause, said: Your Excellencies, my Lords, Ladies and Gentlemen: It has become my duty to open this Congress at the request of His Majesty the King, who had intended personally to take the chair, but under the present circumstances, finding he could not do so, he has desired me to occupy his place. (Cheers.) I therefore consider it my duty to obey his orders, and I hope I shall be forgiven by this vast assembly in undertaking a duty which I really feel I am little able to carry out, certainly not as well as he would have done, and even not as well as I should like to do myself; but the fact is I am very much in the background in regard to all these interesting subjects. I do, however, feel as deep an interest in the matter which has brought you together to-day as does His Majesty, and therefore my whole desire is to assist those who are so kindly surrounding me on this occasion in producing good results, not only for this country, but for every part of the world, foreign and colonial, in the endeavour to mitigate suffering, illness and sickness—an endeavour which we all hope now will be initiated in this great gathering. (Hear, hear.) I am much gratified to see so large a number of delegates from foreign countries attending this Congress. (Cheers.) I welcome them to this country, and I feel assured that they, like myself, are sensible of the great advantages to be obtained from a general spirit being diffused throughout the world as to the importance and necessity of bringing forward such practical methods as may be of advantage in the future to the human race. (Hear, hear.) Ladies and gentlemen, I feel I am too ignorant to give the meeting much detail as to the mode in which this Congress is to be conducted, but I have the complete conviction that all those who are managing these great meetings will have proposals to make to the general public which will be acceptable to them and of great advantage to the object we have in view. (Cheers.) I do not think I am justified in doing more than just opening this Congress, and I hope those who follow will be able to go into details which I confess I do not feel myself to be the proper person to bring before you. I know that every one of us who sits on this platform is as much inspired as I am with the necessity of these meetings and the advantages to be obtained from them. I thank you for allowing me to say these few words. I only spoke them in the name of His Majesty the King, and I now just wish to read to you what I propose to telegraph to His Majesty in your name and my own, now that

the Congress is virtually opened by myself. I am going to telegraph to the King: "I have the honour to inform your Majesty that I have opened the Congress on Tuberculosis, which is largely attended by home and foreign delegates, in obedience to your Majesty's command." If you approve of that will you please signify the same.

(The telegram to the King was approved with acclamation and was at once despatched.)

Gentlemen, I must now leave others to follow me, as they are called upon to do so.

The Most Honourable the Marquess of Lansdowne, K.G. (*Secretary of State for Foreign Affairs*), who was received with loud cheering, said: Your Royal Highness, your Excellencies, my Lords, Ladies and Gentlemen: After the words of welcome which have been spoken to the Congress by His Royal Highness in the name of His Majesty the King, whose interest in the Congress is well known to you, it would be presumptuous on my part to add any welcome of my own; but I may be, perhaps, permitted, as one of His Majesty's servants, to tell you that it will give my colleagues and myself the greatest pleasure, so far as our opportunities permit, to assist you in any way which lies within our power, and to give to you and to those who act on your behalf, any facilities which His Majesty's Government is able to afford. (Cheers.) In saying that I feel sure that I am expressing the wishes of the whole of the people of this country. (Hear, hear.) We fully realise—and I speak now, not of course on behalf of the representatives of science who are assembled in this room, but on the part of those to whom His Royal Highness referred just now as ignorant persons—we fully realise the immense significance of the problem you are attempting to solve. Gentlemen, this country has lately been passing through all the anxiety and sorrow of a prolonged war. To how many of our homes has that war brought desolation and calamity! and yet I am not using the language of exaggeration when I say that no war which has ever been waged by the human race has brought with it anything like the burden of misfortune which tuberculosis has from time immemorial carried with it to the people of the world. (Hear, hear.) It is an enemy more ubiquitous, more insidious than any enemy whom we have to encounter in the open field, and I think we all of us owe an immense debt to those gentlemen whose researches have enabled them to assure us that the enemy is not, as we used to think, invincible, but that his approaches may be encountered; that if he has defeated us hitherto, because we have neglected obvious precautions and resigned ourselves, almost with a feeling of despair, to submit to what we regarded as an inevitable scourge of the human race, we may yet hope to win in the fight which we are waging. (Cheers.) Therefore, gentlemen, I ask your permission to welcome those distinguished visitors who are come here in such numbers, at great trouble and inconvenience to themselves, from a desire to act with the British representatives in devising measures which shall enable us successfully to combat this dangerous enemy of the human race. (Cheers.) I cordially hope that your labours may be

fruitful of good results, and that those practical resolutions which the secretary has told us will be presented at the close of your deliberations, will be productive of those consequences which we all of us trust this Congress may be able to achieve. (Cheers.)

The RIGHT HONOURABLE EARL CADOGAN, K.G., said: Your Royal Highness, my Lords, Ladies and Gentlemen: Until I came into this room a few minutes ago, I was not aware that I was to be called upon, I will not say to make a speech, but even to say a few words, in the presence of this illustrious assembly. If I may be permitted to give a reason for my being called upon on this occasion, I should suggest that it is because in so great and illustrious a gathering as this Congress, representative of many branches of science, representative of all that is great and able in the scientific world, it was thought desirable there should be at any rate some representative of deep, and what I am afraid I must call abysmal, ignorance on the subject which we are met here to deal with. (Laughter.) That, gentlemen, I must confess to be the constituency which I represent, and that, I am afraid, is my only qualification for being asked to address you. But, perhaps, I may be permitted to say that in one respect I claim a *locus standi* here. I have the honour to represent a country which is, I will not say devastated, but which suffers, perhaps, as largely as any other country in Europe from the scourge which you are all met here to consider, and if possible to arrest—I mean Ireland. (Cheers.) If I may believe the official statistics of Ireland which from time to time have been shown to me, there is no disease—except, perhaps, that of old age, which occupies, I am happy to say, the longest column in our columns of statistics—which shows such an enormous figure of disastrous results as that of tuberculosis. The Irish people and the Irish men of science have had their attention turned very seriously to this subject during the last few years; and last year, and again this year, I had the honour of presiding over a meeting in Dublin in which the men of science there expressed their determination to do all they could to combat this scourge, and, if possible, to improve the condition of the health of the people, of Dublin especially, in that respect; therefore, ladies and gentlemen, I am very glad to be allowed, if only on behalf of the people of Ireland, who on this, as on all other subjects, are absolutely unanimous—(laughter)—to add a few words of welcome to the members of this Congress, and especially to the foreign members who have given us the benefit of their presence and assistance on this occasion. (Cheers.) I think that of all the noble attributes which distinguish the professions of medicine and of surgery, there is none which we should admire more than the fact that when, with the assistance of the march of science in the present day, further discoveries are made which lead to new conclusions, those professions are never ashamed and never backward in reverting to better paths and in changing their system, leaving that which they believe to be wrong and adopting that which they believe to be right. (Cheers.) I venture to say, even before this great and illustrious assembly, that I believe it is generally recognised that the method with which tuberculosis has been dealt with in

past years, almost up to the present time, has not been found to be successful, and that the discoveries of modern science have shown that a system will be found before long, which gives us every hope that this scourge can be successfully dealt with. That this may be the result of this conference is my earnest prayer and desire. I wish you every success in the labours which you have undertaken, and I beg to thank you for the kindness with which you have listened to these few remarks. (Cheers.)

The RIGHT HONOURABLE THE LORD MAYOR OF LONDON, who was met with a hearty welcome, said: Your Royal Highness, my Lords, Ladies and Gentlemen: Having regard to the interesting speeches you have already heard, and those which are to follow, and not losing sight of the important fact that this atmosphere at the present moment is somewhat of a heated character, you will be glad to learn, I am sure, that my remarks will be very few. My part in this afternoon's most interesting function is simply, as the representative of the City of London, to bid you, and especially the foreign delegates, a most hearty welcome to the City—(cheers)—and to assure you that the citizens of London regard the important matters upon which you are to deliberate and discuss as second in importance to none that can possibly be considered or conceived. (Cheers.) I anticipate the pleasure of welcoming you to-morrow night. I hope one and all here present will come to the Mansion House. (Cheers.) I beg to assure you that during your stay in London the Mansion House is open to you at all times, and you cannot pay the City a greater compliment than by going there and accepting my invitation as fully and completely as possible. (Cheers.) In the name of the citizens of London I bid you a most hearty, a most thorough, and a most sincere welcome. (Cheers.)

The RIGHT HONOURABLE LORD STRATHCONA AND MOUNT ROYAL, G.C.M.G., who was received with cheers, said: Your Royal Highness, my Lords, Ladies and Gentlemen: The only justification for my appearing here at this moment is that I am connected with one of the great colonies of the Empire, and that I appear on this occasion as representing the Dominion of Canada, the Commonwealth of Australia, and, I may add, all the other Colonies, for they are at one with you in their earnest desire that measures should be taken against that dire disease which has decimated the people of the world for long centuries. (Hear, hear.) I may say just in one word for Canada, that some six or seven years ago an association was authorised and chartered by the Dominion Government, and that that association has been working hard and well ever since. They have already had some 500 patients, and the result of the treatment has been all that could be desired under the circumstances. (Cheers.) Not only Canada, but I feel assured all the Colonies, will join with the mother-country and with those distinguished and eminent gentlemen from other countries who are here to-day. On the part, then, of Canada and of the other Colonies I extend a most hearty welcome to all who have come to aid in this good work, and most heartily do the

Colonies hope that the outcome of your labour may be all that can be looked for from them, and that is very much at the present moment, when the science of medicine and surgery is doing what in former days would have been considered utter impossibilities. I therefore extend to you, on the part of Canada and the Colonies, a most hearty welcome, and I congratulate you and ourselves on this great gathering. (Cheers.)

The RIGHT HONOURABLE LORD LISTER, who was received with enthusiasm, said: Your Royal Highness, your Excellencies, my Lords, Ladies and Gentlemen: I have been requested by the Organising Committee to say a few words on this occasion on behalf of the medical profession in the British Islands. In the first place, let me say how cordially we welcome the illustrious men who have come from all parts of the world to be delegates to this Congress, and how warmly we desire the success of the Congress. It meets under immeasurably happier auspices than could possibly have been the case not many years ago. Thanks to the labours of the illustrious man who will address the general meeting to-morrow—(cheers)—we now know the enemy we have to deal with, which before the discovery of the tubercle bacillus by Koch lay shrouded in impenetrable obscurity. We also know, thanks to Pasteur—(cheers)—that this microbe, like all others, is incapable of originating *de novo* in the human body; that while some constitutions are more prone to its invasion than others, it must always be derived from similar organisms from the external world. Hence there has been opened up the splendid prospect of the prevention of tuberculosis. But it is by no means only prevention that we look at. We also aim, at the present day, at the cure o consumption. (Cheers.) In this respect matters are very much more hopeful than they have been until quite recently. The physician may learn a great deal in this matter from the experience of the surgeon. There are a great many surgical complaints which are now known to be just as tubercular as pulmonary consumption, that is to say, just as much due to the invasion and growth of the tubercle bacillus. Yet the surgeon knows that in many of these cases, if the patient is treated with scrupulous avoidance, as far as possible, of all irritation of the part concerned, and at the same time given as much support and invigoration as possible in regard to general health, these diseases become completely cured—that in consequence of the means, of which we are getting to know more and more, which the animal organism has for resisting its microscopic invaders, the tubercle bacillus is not only arrested in its progress, but swept away altogether, and the result comes to be an absolutely healthy state of the tissues of the parts in which it once resided. Now this surgical experience shows that tubercle is not necessarily an incurable disease. That is an immense point to have perfectly demonstrated. (Cheers.) Thus we are not surprised to learn that physicians are coming to look upon the cure of consumption more hopefully than they used to do, by treating it when recognised early on the same general lines as those on which surgical tuberculosis has been so successfully treated. For my own part, as a surgeon, I have naturally had cases of pulmonary disease brought but

little under my notice, but I have been surprised, within my limited experience, at the numerous cases among my own acquaintances of persons who undoubtedly many years ago had consumptive lungs, yet have for many years past been free from all traces of disease which the physician could discover, and have lived healthy, robust, useful lives in this country. (Cheers.) These cases I venture humbly to regard as cases of the cure of consumption. Then there are attempts now being made by the use of various specific means to deal with consumption in its more advanced forms. But I must not refer to these at the present time, further than to say that some of them have very promising aspects. We may be sure that these means will be most carefully considered by the Congress, and I need not say how greatly I hope and anticipate that the deliberations of the Congress will be fraught with good. But there is another point in which I believe this Congress will be useful, besides the concentrated wisdom of the eminent men who have come as delegates to take part in its work. If the prevention of tuberculosis is to be effectively carried out, the general public must aid the physician and the surgeon in the endeavour. (Cheers.) I anticipate that this splendid gathering of scientific men from all parts of the world, meeting under the royal patronage, for which I may venture to express our profound gratitude, will indicate to the public the vast importance of the work we are engaged in, and will lead to their co-operation with us to minimise, indeed possibly eventually to stamp out entirely, the greatest scourge of the human race. (Cheers.)

Representative delegates of foreign nations were then presented to H.R.H. the Duke of Cambridge by the Earl of Derby, the following being a list of the presentations:—

Professor OSLER	*United States of America.*
Professor VON SCHRÖTTER	*Austria.*
M. le Senateur MONTEFIORI LEVI	*Belgium.*
Professor CHARLES GRAM	*Denmark.*
Professor BROUARDEL	*France.*
Professor VON LEYDEN	*Germany.*
M. CADO	*Greece.*
Professor THOMASSEN	*Holland.*
Professor FRED. KORANYI	*Hungary.*
Professor RUATA	*Italy.*
Professor HOLMBOË	*Norway.*
Professor CORTEZO	*Spain.*
Professor Hofmarshal PRINTZKÖLD	*Sweden.*
M. NEUMANN	*Switzerland.*

Each delegate, on his presentation, spoke on behalf of the nation he represented.

Professor OSLER, speaking for the *United States of America*, said: Your Royal Highness, your Excellencies, my Lords, Ladies and Gentlemen;

Coming as I do from the other side, with a large delegation, let me first assure you that our intentions are entirely peaceful. (Laughter.) There has not been for many years a delegation coming to this city from the United States which was not after some franchise. We come seeking neither franchise nor the organisation of any trust—(laughter)—and yet, Sir, I may say that we do represent a magnificent trust, a trust which is unequalled in the world, a trust which alone could gather such a representative assembly from the different nations that we see here to-day. It is a trust which differs in two respects from the other great trusts. The ordinary trusts, the trusts that you have here and which we have in America, bear on their banner the motto—if the Lord Bishop of London will pardon the expression—"Damn the public"; on the other hand, we bear on the banner of our trust the motto of the medical profession, "*Pro Bono Publico.*" (Cheers.) I could speak at length on the work which is being done towards prevention of tuberculosis in the United States, but it would take far too long. I may say, however, that the work is being pushed on there with energy and with zeal, and the work which these congresses have done has been of immense service in educating the profession —for we need education—and in educating the public—and they need it much more. (Hear, hear.) A remarkable expression occurs in the remarkable book by John Bunyan when he speaks of consumption as "the captain of the men of death." I may say to this audience, and have figures to back it, that the captaincy of consumption has in certain regions been reduced to a lieutenancy, and I may say, too, that through the agencies of such organisations the lieutenant may be reduced to an ensign. I do not say it will ever happen—it is not within the bounds of possibility—that the captain of to-day will be reduced to a private, nor is it possible to hope that he will be "drummed out of the regiment." (Cheers.)

Professor VON SCHRÖTTER, from *Austria*, said: Your Royal Highness, your Excellencies, my Lords, Ladies and Gentlemen: As a delegate appointed by the Austrian Government Home Office and Board of Public Instruction, I feel it is a great honour to stand here in the land which is the home of hygiene and sanitation, especially as a representative of an association, a sanitary board, which has the high patronage of His Imperial Majesty the Emperor Francis Joseph. (Cheers.) It is the first and the only association in my country for the prevention of tuberculosis, yet its endeavours date back as far as the year 1883. Not only do I feel the honour of standing here, but my heart is very thankful at this moment, because I recognise fully I am standing on the ground where the struggle against tuberculosis first began, where I myself found in the year 1862 a Consumption Hospital, a flourishing and excellent institution, established at Ventnor. Bearing these facts in my memory, I most heartily wish that the proceedings of this Congress in the endeavour to prevent tuberculosis may meet with pronounced success. It is working for the welfare of mankind and for the advancement of science. Its predecessors had a severe task in making people acquainted with the difficulties of the subject and new scientific methods, and the glorious Congress

of Berlin exceeded by far all our expectations by drawing the attention of the whole world to a matter of the highest importance. I hope that the results of this present Congress will be a new and successful attack against man's greatest enemy. If I did not succeed at the Congress in Paris with my proposal of an international committee, which I brought forward principally to excite the attention of those in authority, I am sure the struggle against tuberculosis has not been lying dormant, and it will never again sink into apathy, because the series of congresses will have kept the question in continual activity. The whole question is now spread out clearly before the eyes of the world, and recognised as a matter of the very greatest importance, and we can now endeavour to enter upon real practical work for bettering the health of the great masses.

M. MONTEFIORE LEVI, *Belgium*, spoke as follows: Your Royal Highness, my Lords, Ladies and Gentlemen: I consider it a very great honour to be called upon to address this meeting. Allow me to offer, in the name of the Belgian Government, the best wishes for the success of the Congress. For many years my Government—and I may add the Belgian people in general—have followed with great and increasing interest the effort of all the most competent representatives of Great Britain in the struggle against consumption, and its connection, bovine tuberculosis. I trust I may be allowed to congratulate your Royal Highness especially as representing His Gracious Majesty the King, since undoubtedly a very large share of the success may be attributed to the great and active interest shown by His Royal Highness, when Prince of Wales, in the researches and discussions which have led up to the present important Congress. (Cheers.) I am happy to be able to state that Belgium has been amongst the foremost to take active measures of protection against tuberculosis. Statistics seem to show that in our country for quite twenty years there has been a constant diminution in the proportion of deaths from this wide-spread malady, but the diminution is far from being absolutely satisfactory, and we all know that statistics are rarely perfectly reliable, as so much of their apparent teaching may be affected by extraneous circumstances, and they must of necessity fail to give any indication of the same disease and consequent effect on the health and strength of both present and future generations. My colleagues, Dr. van Ryn and Dr. van Benedin, the latter delegated by the Council of the Belgian Provincial Government of Liège, and Dr. G. Martin, delegated by the Belgian Ministry of War, and many other members of the medical corps in Belgium, who have all taken the most active interest for many years in this struggle against tuberculosis, have come over to take a share in the discussion, and several papers will be presented by them, and they will consider it a very great honour to be able to discuss the matter personally with their illustrious colleagues. As I am anxious not to trespass on your valuable time, I will bring my few remarks to a conclusion, wishing in the name of the Belgian Government for the success of your efforts and hoping most sincerely that the work of the Congress will be as fruitful in good results as we may with confidence predict it will. (Cheers.)

Professor CHRISTIAN GRAM, representing *Denmark*, said: Your Royal Highness, my Lords, Ladies and Gentlemen: As representative of Denmark, I have the honour to thank you for the invitation to the British Congress on Tuberculosis. In this year Bretland, as our ancestors the Vikings called Great Britain, will celebrate the reign of Alfred the Great; but we Danes have crossed the West Sea full of peace and quietness. We are coming, not as Vikings, but we are coming to learn, to see, and to hear. Denmark has given you a ransom—the Rose of Denmark, Great Britain's Queen. Denmark is a very small country, but even there we try to combat tuberculosis. Just now we have founded a national league against tuberculosis, and the other Danish representative, Professor Bang, has met with success in combating the disease in quadrupeds. Professor Finsen has invented phototherap, an excellent remedy for lupus. (Hear, hear.) Denmark has two great modern sanatoria and three seaside hospitals for scrofula and tuberculosis in children. We are all fighting in the same army, and we expect that every man will do his duty; otherwise we can never be victorious. God save our work! (Cheers.)

Professor P. BROUARDEL, of *Paris*, said: Your Royal Highness: The members of the French delegation desire to offer you their respectful homage, and beg you to convey to His Majesty the King the expression of their deep gratitude.

In consenting to take the British Congress on Tuberculosis under his exalted patronage, His Majesty has shown at the outset of his reign that his first consideration will ever be for the welfare of the nation.

Your Royal Highness, in presiding over this meeting, assures us afresh that this solicitude for the nation's health is shared by all those exalted personages who, by their counsels, have helped to make the prosperity of Great Britain. The hygienists of all nations desire to offer you their grateful thanks. They would be powerless in their struggle against tuberculosis without the support of public opinion. But when, as we see to-day, the impulse is given by those who represent the nation's highest and noblest aspirations, the interest of individuals is aroused, their efforts are combined, and a flow of generous enthusiasm is created, public opinion is conquered, and success is assured.

The congress held at Berlin two years ago showed the truth of this. The support given to it by their Imperial Majesties rent the veil which still concealed from the great majority of people the value of the recent scientific discoveries.

No sooner was this knowledge—so new and enlightening—gained, thanks to the discussions at that congress, than there was an outburst of generous enthusiasm in all countries.

The present gathering will produce no less important results; we recognise the work done by your great hygienists, and we know how you have combated darkness and damp in houses and workshops. The struggle began during the reign of Queen Victoria, and in fifty years the mortality from tuberculosis has diminished by almost one-half.

In a few days' time we shall be telling France what you have done; we shall incite our fellow-countrymen to imitate you; let us hope they will display similar perseverance; whatever may be the difficulties which habits and customs may place in our path, the obstacles themselves shall incite us to victory.

As in London, we shall have in Paris the co-operation of the public authorities. I have a proof of that in the fact that I have the great honour to be charged by the President of the Republic to declare in his name that there is nothing he desires more than that the next congress on tuberculosis shall be held in Paris in two years' time.

I hope that our colleagues and friends who are representing their various nations in London at the present time will permit me to inform the President of the Republic that his wish has been granted.

The undertaking to which we are pledged has already made great progress; the dawn of the new century opens up vistas of hope; no former century has witnessed so universal an effort to benefit humanity.

The reason for this is plain. For the first time philanthropists can rely on the support of science, not on mere scientific theories, but on certain facts accepted by medical experts throughout the world. There is absolute unanimity of opinion between those who study this disease in patients in hospitals and those who conduct experiments in laboratories.

The anatomical pathologists, Laennec and Caswell, declared as early as 1836 that phthisis was curable. Clinical surgeons also held this view, but these opinions found no echo. In the eyes of the general public and of the large majority of medical men phthisis was branded as fatal.

When Villemin had shown by his experiments the contagious nature of tuberculosis, and had pointed out the various modes of contagion, when Robert Koch showed the world the agent of contagion, then these disputed statements became truths proved and accepted, and are to-day unquestioned.

Philanthropists who held these convictions had for many centuries sought to lessen the extensive misery and suffering caused by tuberculosis. Those convictions are now confirmed by recent scientific discoveries. It is *this union* of science and philanthropy which characterises the new phase of the struggle against tuberculosis; it is this which ensures its success.

Assemblies like this which His Majesty the King has taken under his patronage, and over which your Royal Highness has graciously consented to preside, mark an era in history; their memory will be preserved by all; they point to a future lessening of the sufferings of humanity.

In the name of the French delegates, I beg your Royal Highness to accept our grateful thanks.

Professor Dr. VON LEYDEN, speaking for Germany, said, in his own language: Your Royal Highness, your Excellencies, my Lords, Ladies and Gentlemen: I must beg permission to speak in my mother-tongue. In the name of the German Central Committee for the Erection of Sanatoria, in the name of the committee which has worked for this Congress in Germany,

and in the name of the Germans assembled here for the Congress, I am delighted to offer to you, especially to the Organising Committee and to the President, our hearty sympathy and our good wishes for the progress of this distinguished and remarkable Congress. At the same time we thank you for the great kindness and hospitality with which we have been received in this great capital of your kingdom.

We Germans have appeared here in large numbers, full of sympathy for the Congress, and rejoice to see the wider spread of the work which had its beginning two years ago in Berlin. We are fortunate to be able to co-operate in the development of this work, which lies so near to all our hearts, and which is called to serve both science and humanity.

Since the congress in Berlin, at which I had the honour to hold office as second president, we have not been idle in Germany. We have made many advances in this question of humanity and health. Especially I am proud to remark that the number of our sanatoria, of popular sanatoria (for the poor, and for people of small means), has increased considerably during these years. In the year 1899 we had twenty-two sanatoria, and in 1900 the number was thirty-nine, but in this year it is fifty-nine. (Cheers.) But in this year we expect nineteen more will be opened.

In these sanatoria, last year, we were able to treat 12,000 sick people, allowing that the regular change of patients took place after three months. There were not, therefore, 12,000 beds, but 12,000 sick people for the year in them in the year 1900. At present this number has risen to 20,000 patients, so that already a considerable number more have been taken in and been rightly treated. We are delighted at these advances, for which we have to thank the German Central Committee.

If I may be allowed to continue longer, then I should like to make known that the Central Committee has also erected "Polikliniken" for the adequate and careful treatment of incurable lung patients. A course of lectures has been arranged by experts for doctors, who are now called upon to make use in practice of the latest scientific advances of the sanatorium system.

I have still to add that we are now building sanatoria for children.

Amongst the sanatoria which were either erected or opened in the preceding years, I name especially the institution at Belzig, near Berlin, in which I am concerned, and which has been erected entirely by benevolent means, and which has been so perfectly carried out that it—I can, indeed, affirm it—has found appreciation on all sides. Amongst these sanatoria we are on the way to erecting one for children, and thereby are following the example set us in France.

Finally, I yet should like to say that although the question how far people with severe lung disease can be helped has been often considered, up till now the right means have not been found.

Illustrious assembly, for two years, since the inauguration of this Congress, what we in Germany call the humane movement towards the erection of sanatoria has developed on all sides and taken a fresh impetus, for which we thank you with all our hearts. But we are, of course, extremely delighted and

grateful that this year's Congress is taking place in the powerful British kingdom, which through its vast colonies, embracing the whole circle of the earth, offers a field in which we hope much that is new and good will grow on this question.

We remember at the same time, with full recognition and with gratitude, that the first movement, after a really long time of inaction, towards the combating of tuberculosis came from England. Many years ago—if I am not mistaken, so early as the year 1820—the first hospital for lung diseases was built, the still existing Hospital for Diseases of the Chest, the famous Brompton Hospital, which together with the hospital in the Isle of Wight, at Ventnor, still work with great blessing and have joined our movement. We think that in England the fight against the people's illnesses has been taken up most earnestly, and that in the development of hospital management, of modern sick nursing, England has always stood in the first rank, whilst we see ourselves standing in the first rank in the fight against tuberculosis.

I repeat my wish that this Congress may be very successful, and have great results, for the fame of science, for the fame of humanity, as well as for the fame of all nations. (Applause.)

Professor CADO, *Greece*, then added a few words in French, thanking the Congress for their invitation and dwelling on the interest which his country took in the movement.

The HONORARY SECRETARY-GENERAL here rose from his seat, and said: I am requested by His Royal Highness to read to you the answer which has been received from His Majesty the King: "To the Duke of Cambridge. I have just received your telegram. I thank you for having kindly consented to open the Congress in my name, and I am glad to hear that the ceremony has passed off so well. Pray heartily welcome from me the eminent men belonging to almost every nation who have assembled to-day under your presidency, and express to them my earnest hope that the valuable information which they will give to the world as the result of the deliberations of the British Congress on Tuberculosis will assist in mitigating the dire disease which has baffled the most distinguished physicians for so long. EDWARD REX." (Cheers.)

Professor THOMASSEN, of Utrecht, speaking as representative of *Holland*, said: Your Royal Highness, Members of the Organising Committee, Ladies and Gentlemen: The majority of governments and learned societies have responded to the invitation of the Congress by nominating delegates, who are to-day assembled under this roof amidst a throng of other medical representatives from Great Britain and abroad. The hearty support received on all sides proves that the noble object before you is fully appreciated abroad.

Indeed, the international assembly under the exalted patronage of His Majesty the King bears a noble character, seeking only, as it does, to come to the relief of suffering humanity.

During the next four days men of science assembled from all parts of the world are to discuss what are the necessary methods to be adopted to resist a common enemy, a scourge which remorselessly attacks and carries off its victims usually in the full vigour of life.

Tuberculosis has by its ever-increasing ravages attracted public attention, and scientific men have realised the necessity of setting to work to search for weapons with which to resist it.

France has taken the initiative in organising international congresses devoted exclusively to the study of this deadly disease. Germany and Italy followed its example, and to-day we are assembled under the exalted presidency of His Royal Highness the Duke of Cambridge for the purpose of discussing methods of putting a stop to its ravages, both among the human race and domestic animals.

The Seventh International Congress has a special feature which I wish to point out.

At the head of the Honorary Committee we see a cluster of illustrious names of high dignitaries, quite unconnected with medical science. This fact ensures us a strong support in our efforts, and gives us every hope that the resolutions we shall pass before separating will soon take practical shape.

I also have the greatest pleasure in saying that the Organising Committee have acquitted themselves of their task in a manner beyond all praise, and in this connection I have the honour, gentlemen, to offer you the thanks of my fellow-countrymen for all the care you have taken in the preparation of this undertaking, from which all classes of society will benefit.

That the Congress may bear abundant fruit is the wish I am authorised to convey to you in the name of Holland, of which country I have the honour to be one of the representatives.

Professor KORANYI, the Government representative of Hungary, speaking in German, said: Your Royal Highness, Ladies and Gentlemen: In the name of the kingdom of Hungary and its Government, I have the honour to express the deepest thanks to the Congress for the invitation to this scientific and humane work in this classic home of hygiene. Here, where science and Government administration in all branches of State control work together, the Congress will effect much that is great for humanity. I wish and hope for the fulfilment of all this, and invoke a blessing on His Majesty the King, on his people, and at the same time on this Congress.

Professor RUATA, on behalf of *Italy*, said: Your Royal Highness, my Lords, Ladies and Gentlemen: I have the great honour to express in the name of Italy the profound and deepest admiration for the great people of England, and for all the good that that people has done for social progress and particularly in the prevention of disease. We have seen in past years England putting out her hand to all the nations, and teaching them great lessons in the prevention of disease. I remember the work of Dr. George Boddington in sanitation, and the laws dictated by him in 1837 are followed

by all the nations at the present day. (Cheers.) I remember also that the great science of surgery had its birth in this country, because although France gave Pasteur to the nations, we must not forget that England gave us Lord Lister. (Cheers.) Before Lister, surgery was not a science. I also remember that although the great struggle against tuberculosis is going on in every nation, it had its birth in England. We see, according to the statistics, that the death-rate from tuberculosis has decreased from 28 per 10,000 in 1860 to 13 per 10,000 in 1900, due to the improvement of sanitation. This is a great lesson for all nations. It teaches us that it is not only necessary to have sanatoria for treating disease, but necessary that all our houses should be kept as clean as sanatoria are. We in Italy desire that our houses should be clean and regulated in this manner. I may perhaps apply the great sentence uttered by the King when he was Prince of Wales, in offering a welcome to the former Congress: "If tuberculosis is preventible, why is it not prevented?" (Cheers.) That is a great practical question. I express to England in the name of Italy the gratitude and deep recognition of what she has done for all the world. (Cheers.)

Professor HOLMBOË, speaking for *Norway*, said: Your Royal Highness: As a delegate from Norway I have the honour of presenting our very best thanks for the invitation to this important Congress, held in a country with which Norway has so many friendly relations, a country which has already obtained, through its excellent hygienic institutions, a decided decrease in tubercular disease. To this I add the wish that the expectations justly connected with this Congress may be richly fulfilled, and that the results of the Congress may prove an important step in the labour for the prevention of consumption which all civilised States have now jointly undertaken. (Cheers.)

Professor CORTEZO, speaking as the representative of *Spain*, expressed his pleasure in coming to the Congress, and said the greatest sympathy was shown in his country for the fight against the disease.

Professor Hofmarshal PRINTZKÖLD, *Sweden*, said: In my capacity as delegate for Sweden I have the honour to respectfully salute your Royal Highness, and to say that my Government gladly accepted the invitation to take part in this Congress, wishing in this way to show how much it realised the great importance and interest of the subjects it deals with.

The Swedish deputation cannot itself contribute very much to these labours, but it hopes to profit as much as possible from your ideas and experiences. I am very particularly charged by their Majesties the King and Queen to convey to your Royal Highness the lively sympathy their Majesties have with the humane work of this Congress and the expression of their best wishes for its success.

M. NEUMANN, of *Switzerland*, spoke as follows: Your Royal Highness,

my Lords and Gentlemen: Although the representative of the smallest country which I believe has been invited to this Congress, I think it is my duty to thank you, and the Organising Committee, for the honour you have done us in inviting us to this great Congress. We hope that, although a small country, we shall be able to keep on a level and march shoulder to shoulder with the greater nations in fighting this our worst enemy. (Cheers.)

VOTE OF THANKS TO H.R.H. THE DUKE OF CAMBRIDGE.

The RIGHT HONOURABLE THE EARL OF DERBY, K.G., President of the Organising Council of the Congress, who was received with cheers, said: Your Royal Highness, your Excellencies, my Lords, Ladies and Gentlemen: There is devotion found not only in the medical profession, where we admire and love it, but in other walks of life, and I think you will join with me—for I venture to make myself the mouthpiece of all—in thanking H.R.H. the Duke of Cambridge for the manner in which he has discharged his duties in the chair in a meeting lasting necessarily over a long period of time, and though no doubt full of interest, still perhaps a task which physically is rather a great one. He has performed it with the same cheerfulness with which in other walks of life he has always discharged his duties. (Cheers.) In the absence of the King and other members of the Royal Family, I would venture to say before His Royal Highness' face that no worthier representative could have been found to give that welcome which the King himself was debarred from giving. I will only ask you to show your appreciation of the manner in which His Royal Highness has fulfilled the duties of the chair, and to thank him most heartily for having come here. (Cheers.)

Sir WILLIAM BROADBENT, K.C.V.O., Chairman of the Organising Council, who was also warmly received, said: On the part of the medical members of this Congress I have great satisfaction in asking you to join in this expression of thanks to His Royal Highness for his presence here to-day. It is nothing short of heroic for him to come out on a day like this and to face the fatigues of a meeting such as we have had. (Cheers.) I am sure that all will remember this meeting, not only on account of the admirable speeches we have heard, but they will count it an honour to have been present at a meeting presided over by His Royal Highness. I am certain that all our foreign guests will appreciate highly his gracious presence here to-day. With great pleasure I have to second the vote of thanks proposed by Lord Derby.

The Resolution was carried with acclamation.

The CHAIRMAN, in reply, said: I appreciate very much the kind way in which you have supported me on this occasion. I feel how very unsatisfactory a President I have been ("No, no"); but I obey the orders, which I always do when I can possibly do so, of His Majesty the King, and I am sure

he will appreciate the very kind manner in which you have received his representative on this occasion. Before we leave this room I think I may just mention that there is a sum of £120,000—I do not know from whom it comes—set aside, I believe, for the establishment of one of the first sanatoria that are necessary to carry out the requirements of this Congress. I think it right to let you know that I believe there is somewhere or other that sum waiting to be accepted by the public. (Cheers.)

(The meeting then closed.)

SECOND GENERAL MEETING.

The SECOND GENERAL MEETING of the CONGRESS was held in ST. JAMES'S HALL, PICCADILLY, on Tuesday afternoon, JULY 23rd, 1901. The RIGHT HONOURABLE LORD LISTER, F.R.S., taking the CHAIR at 3 P.M., opened the the meeting by saying: Ladies and Gentlemen,—To those of you who belong to the medical profession, no words are necessary from me to introduce Robert Koch. (Applause.) To others I may say, very briefly, that he may be said to be the foremost of living bacteriologists—(applause)—that he devised the simple but most efficacious means of separating the individual bacterium from the host of others that may accompany it, and cultivating it with perfect certainty in a pure state. He discovered by this method of his the microbe of cholera, the knowledge of which enables us to ward off that dreadful scourge from our shores. (Applause.) Without referring to other of his many achievements, I may remind you that he is the discoverer of the bacillus of tubercle—(applause)—which constitutes the only reliable basis on which our preventive means against tuberculosis rest. I therefore, ladies and gentlemen, have great pleasure in asking you to listen to Dr. Koch.

Professor R. KOCH, who was received with great applause, said: My Lord Lister, Ladies and Gentlemen,—The task with which this Congress will have to busy itself is one of the most difficult, but it is also one in which labour is most sure of its reward.

I need not point again to the innumerable victims tuberculosis annually claims in all countries, nor to the boundless misery it brings on the families it attacks. You all know that there is no disease which inflicts such deep wounds on mankind as this. All the greater, however, would be the general joy and satisfaction if the efforts that are being made to rid mankind of this enemy, which consumes its inmost marrow, were crowned with success.

There are many, indeed, who doubt the possibility of successfully combating this disease, which has existed for thousands of years, and has spread all over the world. This is by no means my opinion. This is a conflict into which we may enter with a surely founded prospect of success, and I will tell you the reasons on which I base this conviction.

Only a few decades ago the real nature of tuberculosis was unknown to us; it was regarded as a consequence, as the expression, so to speak, of social misery, and, as this supposed cause could not be got rid of by simple means, people relied on the probable gradual improvement of social conditions, and did nothing. All this is altered now. We know that social misery does indeed go far to foster tuberculosis, but the real cause of the disease is a parasite—that is, a visible and palpable enemy, which we can pursue and annihilate, just as we can pursue and annihilate other parasitic enemies of mankind.

Strictly speaking, the fact that tuberculosis is a preventible disease ought to have become clear as soon as the tubercle-bacillus was discovered, and the properties of this parasite and the manner of its transmission became known. I may add that I, for my part, was aware of the full significance of this discovery from the first, and so will everybody have been who had convinced himself of the causal relation between tuberculosis and the tubercle-bacillus. But the strength of a small number of medical men was inadequate to the conflict with a disease so deeply rooted in our habits and customs. Such a conflict requires the co-operation of many, if possible of all, medical men, shoulder to shoulder with the State and the whole population; but now the moment when such co-operation is possible seems to have come. I suppose there is hardly any medical man now who denies the parasitic nature of tuberculosis, and among the non-medical public too the knowledge of the nature of the disease has been widely propagated.

Another favourable circumstance is that success has recently been achieved in the combating of several parasitic diseases, and that we have learned from these examples how the conflict with pestilences is to be carried on.

The most important lesson we have learned from the said experience is that it is a great blunder to treat pestilences uniformly. This was done in former times; no matter whether the pestilence in question was cholera, plague, or leprosy, isolation, quarantine, useless disinfection were always resorted to. But now we know that every disease must be treated according to its own special individuality, and that the measures to be taken against it must be most accurately adapted to its special nature, to its etiology. We are entitled to hope for success in combating tuberculosis only if we keep this lesson constantly in view. As so extremely much depends just on this point I shall take the liberty to illustrate it by several examples.

The pestilence which is at this moment in the foreground of interest, the bubonic plague, may be instructive to us in several respects

People used to act upon the conviction that a plague patient was in the highest degree a centre of infection, and that the disease was transmitted only by plague patients and their belongings. Even the most recent international agreements are based on this conviction. Although, as compared with formerly, we now have the great advantage that we can, with the aid of the microscope and of experiments on animals, recognise every case of plague with absolute certainty, and although the prescribed inspection of ships, quarantine, the isolation of patients, the disinfection of infected dwellings and ships, are carried out with the utmost care, the plague has, nevertheless, been transmitted everywhere, and has in not a few places assumed grave dimensions. Why this has happened we know very well, owing to the experience quite recently gained as to the manner in which the plague is transmitted. It has been discovered that only those plague patients that suffer from plague-pneumonia—a condition which is fortunately infrequent—are centres of infection, and that the real transmitters of the plague are the rats. There is no longer any doubt that, in by far the majority of the cases in which the

plague has been transmitted by ocean traffic, the transmission took place by means of plague among the ship rats. It has also been found that, wherever the rats were intentionally or unintentionally exterminated, the plague rapidly disappeared; whereas at other places, where too little attention had been paid to the rat plague, the pestilence continued. This connection between the human plague and the rat plague was totally unknown before, so that no blame attaches to those who devised the measures now in force against the plague if the said measures have proved unavailing. It is high time, however, that this enlarged knowledge of the etiology of the plague be utilised in international as well as in other traffic. As the human plague is so dependent on the rat plague, it is intelligible that protective inoculation and the application of antitoxic serum have had so little effect. A certain number of human beings may have been saved from the disease by that, but the general spread of the pestilence has not been hindered in the least.

With cholera the case is essentially different; it may, under certain circumstances, be transmitted directly from human beings to other human beings, but its main and most dangerous propagator is water, and therefore, in the combating of cholera, water is the first thing to be considered. In Germany, where this principle has been acted on, we have succeeded for four years in regularly exterminating the pestilence (which was introduced again and again from the infected neighbouring countries) without any obstruction of traffic.

Hydrophobia, too, is not void of instruction for us. Against this disease the so-called protective inoculation proper has proved eminently effective as a means of preventing the outbreak of the disease in persons already infected, but, of course, such a measure can do nothing to prevent infection itself. The only real way of combating this pestilence is by compulsory muzzling. In this matter also we have had the most satisfactory experience in Germany, but have at the same time seen that the total extermination of the pestilence can be achieved only by international measures; because hydrophobia, which can be very easily and rapidly suppressed, is always introduced again year after year from the neighbouring countries.

Permit me to mention only one other disease, because it is etiologically very closely akin to tuberculosis, and we can learn not a little for the furtherance of our aims from its successful combating. I mean leprosy. It is caused by a parasite which greatly resembles the tubercle-bacillus. Just like tuberculosis, it does not break out till long after infection, and its course is almost slower. It is transmitted only from person to person, but only when they come into close contact, as in small dwellings and bedrooms. In this disease, accordingly, immediate transmission plays the main part; transmission by animals, water, or the like is out of the question. The combative measures, accordingly, must be directed against this close intercourse between the sick and the healthy. The only way to prevent this intercourse is to isolate the patients. This was most rigorously done in the Middle Ages by means of numerous leper-houses, and the consequence was that leprosy, which had spread to an alarming extent, was completely stamped out in Central

Europe. The same method has been adopted quite recently in Norway, where the segregation of lepers has been ordered by a special law. But it is extremely interesting to see how this law is carried out. It has been found that it is not at all necessary to execute it strictly, for the segregation of only the worst cases, and even of only a part of these, sufficed to produce a diminution of leprosy. Only so many infectious cases had to be sent to the leper-houses that the number of fresh cases kept regularly diminishing from year to year. Consequently the stamping out of the disease has lasted much longer than it would have lasted if every leper had been inexorably consigned to a leper-house, as in the Middle Ages; but in this way too the same purpose is gained, slowly indeed, but without any harshness.

These examples may suffice to show what I am driving at, which is to point out that, in combating pestilences, we must strike at the root of the evil, and must not squander force in subordinate ineffective measures. Now the question is whether what has hitherto been done, and what is about to be done against tuberculosis, really strikes at the root of tuberculosis, so that it must sooner or later die.

In order to answer this question it is necessary first and foremost to inquire how infection takes place in tuberculosis. Of course, I presuppose that we understand by tuberculosis only those morbid conditions which are caused by the tubercle-bacillus.

In by far the majority of cases of tuberculosis the disease has its seat in the lungs, and has also begun there. From this fact it is justly concluded that the germs of the disease, *i.e.*, the tubercle-bacilli, must have got into the lungs by inhalation. As to the question where the inhaled tubercle-bacilli have come from, there is also no doubt. On the contrary, we know with certainty that they get into the air with the sputum of consumptive patients. This sputum, especially in advanced stages of the disease, almost always contains tubercle-bacilli, sometimes in incredible quantities. By coughing, and even speaking, it is flung into the air in little drops, *i.e.*, in a moist condition, and can at once infect persons who happen to be near the coughers. But then it may also be pulverised when dried, in the linen or on the floor, for instance, and get into the air in the form of dust.

In this manner a complete circle, a so-called *circulus vitiosus*, has been formed for the process of Infection, from the diseased lung, which produces phlegm and pus containing tubercle-bacilli, to the formation of moist and dry particles (which, in virtue of their smallness, can keep floating a good while in the air), and finally to new Infection, if particles penetrate with the air into a healthy lung and originate the disease anew. But the tubercle-bacilli may get to other organs of the body in the same way, and thus originate other forms of tuberculosis. This, however, is a considerably rarer case. The sputum of consumptive people, then, is to be regarded as the main source of the Infection of tuberculosis. On this point, I suppose, all are agreed. The question now arises whether there are not other sources too, copious enough to demand consideration in the combating of tuberculosis.

Great importance used to be attached to the hereditary transmission of

tuberculosis. Now, however, it has been demonstrated by thorough investigation that, though hereditary tuberculosis is not absolutely non-existent, it is nevertheless extremely rare, and we are at liberty, in considering our practical measures, to leave this form of origination entirely out of account.

But another possibility of tubercular Infection exists, as is generally assumed, in the transmission of the germs of the disease from tubercular animals to man. This manner of Infection is generally regarded nowadays as proved, and as so frequent that it is even looked upon by not a few as the most important, and the most rigorous measures are demanded against it. In this Congress also the discussion of the danger with which the tuberculosis of animals threatens man will play an important part. Now, as my investigations have led me to form an opinion deviating from that which is generally accepted, I beg your permission, in consideration of the great importance of this question, to discuss it a little more thoroughly.

Genuine tuberculosis has hitherto been observed in almost all domestic animals, and most frequently in poultry and cattle. The tuberculosis of poultry, however, differs so much from human tuberculosis that we may leave it out of account as a possible source of Infection for man. So, strictly speaking, the only kind of animal tuberculosis remaining to be considered is the tuberculosis of cattle, which, if really transferable to man, would indeed have frequent opportunities of infecting human beings through the drinking of the milk and the eating of the flesh of diseased animals.

Even in my first circumstantial publication on the etiology of tuberculosis I expressed myself regarding the identity of human tuberculosis and bovine tuberculosis with reserve. Proved facts which would have enabled me sharply to distinguish these two forms of the disease were not then at my disposal, but sure proofs of their absolute identity were equally undiscoverable, and I therefore had to leave this question undecided. In order to decide it, I have repeatedly resumed the investigations relating to it, but so long as I experimented on small animals, such as rabbits and guinea-pigs, I failed to arrive at any satisfactory result, though indications which rendered the difference of the two forms of tuberculosis probable were not wanting. Not till the complaisance of the Ministry of Agriculture enabled me to experiment on cattle, the only animals really suitable for these investigations, did I arrive at absolutely conclusive results. Of the experiments which I have carried out during the last two years along with Professor Schütz, of the Veterinary College in Berlin, I will tell you briefly some of the most important.

A number of young cattle which had stood the tuberculin test, and might therefore be regarded as free from tuberculosis, were infected in various ways with pure cultures of tubercle-bacilli taken from cases of human tuberculosis; some of them got the tubercular sputum of consumptive patients direct. In some cases the tubercle-bacilli or the sputum were injected under the skin, in others into the peritoneal cavity, in others into the jugular vein. Six animals were fed with tubercular sputum almost daily for seven or eight months; four repeatedly inhaled great quantities of bacilli, which were distributed in water, and scattered with it in the form of spray. None of these cattle (there were

nineteen of them) showed any symptoms of disease, and they gained considerably in weight. From six to eight months after the beginning of the experiments they were killed. In their internal organs not a trace of tuberculosis was found. Only at the places where the injections had been made small suppurative foci had formed, in which few tubercle-bacilli could be found. This is exactly what one finds when one injects dead tubercle-bacilli under the skin of animals liable to contagion. So the animals we experimented on were affected by the living bacilli of human tuberculosis exactly as they would have been by dead ones; they were absolutely insusceptible to them.

The result was utterly different, however, when the same experiment was made on cattle free from tuberculosis with tubercle-bacilli that came from the lungs of an animal suffering from bovine tuberculosis. After an incubation-period of about a week the severest tubercular disorders of the internal organs broke out in all the infected animals. It was all one whether the infecting matter had been injected only under the skin or into the peritoneal cavity or the vascular system. High fever set in, and the animals became weak and lean; some of them died after a month and a half to two months, others were killed in a miserably sick condition after three months. After death extensive tubercular infiltrations were found at the place where the injections had been made, and in the neighbouring lymphatic glands, and also far advanced alterations of the internal organs, especially the lungs and the spleen. In the cases in which the injection had been made into the peritoneal cavity, the tubercular growths which are so characteristic of bovine tuberculosis were found on the omentum and peritoneum. In short, the cattle proved just as susceptible to Infection by the bacillus of bovine tuberculosis as they had proved insusceptible to Infection by the bacillus of human tuberculosis. I wish only to add that preparations of the organs of the cattle which were artificially infected with bovine tuberculosis in these experiments are exhibited in the Museum of Pathology and Bacteriology.

An almost equally striking distinction between human and bovine tuberculosis was brought to light by a feeding experiment with swine. Six young swine were fed daily for three months with the tubercular sputum of consumptive patients. Six other swine received bacilli of bovine tuberculosis with their food daily for the same period. The animals that were fed with sputum remained healthy and grew lustily, whereas those that were fed with the bacilli of bovine tuberculosis soon became sickly, were stunted in their growth, and half of them died. After three months and a half the surviving swine were all killed and examined. Among the animals that had been fed with sputum no trace of tuberculosis was found, except here and there little nodules in the lymphatic glands of the neck, and in one case a few grey nodules in the lungs. The animals, on the other hand, which had eaten bacilli of bovine tuberculosis had, without exception (just as in the cattle experiment), severe tubercular diseases, especially tubercular infiltration of the greatly enlarged lymphatic glands of the neck and of the mesenteric glands, and also extensive tuberculosis of the lungs and the spleen.

The difference between human and bovine tuberculosis appeared not less

strikingly in a similar experiment with asses, sheep, and goats, into whose vascular systems the two kinds of tubercle-bacilli were injected.

Our experiments, I must add, are not the only ones that have led to this result. If one studies the older literature of the subject, and collates the reports of the numerous experiments that were made in former times by Chauveau, Günther and Harms, Bollinger, and others, who fed calves, swine, and goats with tubercular material, one finds that the animals that were fed with the milk and pieces of the lungs of tubercular cattle always fell ill of tuberculosis, whereas those that received human material with their food did not. Comparative investigations regarding human and bovine tuberculosis have been made very recently in North America by Smith, Dinwiddie, and Frothingham, and their result agreed with that of ours. The unambiguous and absolutely conclusive result of our experiments is due to the fact that we chose methods of Infection which exclude all sources of error, and carefully avoided everything connected with the stalling, feeding, and tending of the animals that might have a disturbing effect on the experiments.

Considering all these facts, I feel justified in maintaining that human tuberculosis differs from bovine, and cannot be transmitted to cattle. It seems to me very desirable, however, that these experiments should be repeated elsewhere, in order that all doubt as to the correctness of my assertion may be removed.

I wish only to add that, owing to the great importance of this matter, the German Government has appointed a commission to make further inquiries on the subject.

But, now, how is it with the susceptibility of man to bovine tuberculosis? This question is far more important to us than that of the susceptibility of cattle to human tuberculosis, highly important as that is too. It is impossible to give this question a direct answer, because, of course, the experimental investigation of it with human beings is out of the question. Indirectly, however, we can try to approach it. It is well known that the milk and butter consumed in great cities very often contain large quantities of the bacilli of bovine tuberculosis in a living condition, as the numerous infection-experiments with such dairy products on animals have proved. Most of the inhabitants of such cities daily consume such living and perfectly virulent bacilli of bovine tuberculosis, and unintentionally carry out the experiment which we are not at liberty to make. If the bacilli of bovine tuberculosis were able to infect human beings, many cases of tuberculosis caused by the consumption of alimenta containing tubercle-bacilli could not but occur among the inhabitants of great cities, especially the children. And most medical men believe that this is actually the case.

In reality, however, it is not so. That a case of tuberculosis has been caused by alimenta can be assumed with certainty only when the intestine suffers first—*i.e.*, when a so-called primary tuberculosis of the intestine is found. But such cases are extremely rare. Among many cases of tuberculosis examined after death, I myself remember having seen primary tuberculosis of the intestine only twice. Among the great post-mortem material

of the Charité Hospital in Berlin ten cases of primary tuberculosis of the intestine occurred in five years. Among 933 cases of tuberculosis in children at the Emperor and Empress Frederick's Hospital for Children, Baginsky never found tuberculosis of the intestine without simultaneous disease of the lungs and the bronchial glands. Among 3,104 post-mortems of tubercular children, Biedert observed only sixteen cases of primary tuberculosis of the intestine I could cite from the literature of the subject many more statistics of the same kind, all indubitably showing that primary tuberculosis of the intestine, especially among children, is a comparatively rare disease, and of these few cases that have been enumerated, it is by no means certain that they were due to Infection by bovine tuberculosis. It is just as likely that they were caused by the widely-propagated bacilli of human tuberculosis, which may have got into the digestive canal in some way or other—for instance, by swallowing saliva of the mouth. Hitherto nobody could decide with certainty in such a case whether the tuberculosis of the intestine was of human or of animal origin. Now we can diagnose them. All that is necessary is to cultivate in pure culture the tubercle-bacilli found in the tubercular material, and to ascertain whether they belong to bovine tuberculosis by inoculating cattle with them. For this purpose I recommend subcutaneous injection, which yields quite specially characteristic and convincing results. For half a year past I have occupied myself with such investigations, but, owing to the rareness of the disease in question, the number of the cases I have been able to investigate is but small. What has hitherto resulted from this investigation does not speak for the assumption that bovine tuberculosis occurs in man.

Though the important question whether man is susceptible to bovine tuberculosis at all is not yet absolutely decided, and will not admit of absolute decision to-day or to-morrow, one is nevertheless already at liberty to say that, if such a susceptibility really exists, the infection of human beings is but a very rare occurrence. I should estimate the extent of infection by the milk and flesh of tubercular cattle, and the butter made of their milk, as hardly greater than that of hereditary transmission, and I therefore do not deem it advisable to take any measures against it.

So the only main source of the Infection of tuberculosis is the sputum of consumptive patients, and the measures for the combating of tuberculosis must aim at the prevention of the dangers arising from its diffusion. Well, what is to be done in this direction? Several ways are open. One's first thought might be to consign all persons suffering from tuberculosis of the lungs, whose sputum contains tubercle-bacilli, to suitable establishments. This, however, is not only absolutely impracticable, but also unnecessary. For a consumptive who coughs out tubercle-bacilli is not necessarily a source of Infection on that account, so long as he takes care that his sputum is properly removed and rendered innocuous. This is certainly true of very many patients, especially in the first stages, and also of those who belong to the well-to-do classes, and are able to procure the necessary nursing. But how is it with people of very small means? Every medical man who has often entered the dwellings of the poor, and I can speak on this point from

my own experience, knows how sad is the lot of consumptives and their families there. The whole family have to live in one or two small, ill-ventilated rooms. The patient is left without the nursing he needs, because the able-bodied members of the family must go to their work. How can the necessary cleanliness be secured under such circumstances? How is such a helpless patient to remove his sputum, so that it may do no harm? But let us go a step further and picture the condition of a poor consumptive patient's dwelling at night. The whole family sleep crowded together in one small room. However cautious he may be, the sufferer scatters the morbid matter secreted by his diseased lungs every time he coughs, and his relatives close beside him must inhale this poison. Thus whole families are infected. They die out, and awaken in the minds of those who do not know the infectiousness of tuberculosis the opinion that it is hereditary, whereas its transmission in the cases in question was due solely to the simplest processes of Infection, which do not strike people so much, because the consequences do not appear at once, but generally only after the lapse of years.

Often, under such circumstances, the Infection is not restricted to a single family, but spreads in densely-inhabited tenement-houses to the neighbours, and then, as the admirable investigations of Biggs have shown in the case of the densely-peopled parts of New York, regular nests or foci of disease are formed. But, if one investigates these matters more thoroughly, one finds that it is not poverty *per se* that favours tuberculosis, but the bad domestic conditions under which the poor everywhere, but especially in great cities, have to live. For, as the German statistics show, tuberculosis is less frequent, even among the poor, when the population is not densely packed together, and may attain very great dimensions among a well-to-do population when the domestic conditions, especially as regards the bedrooms, are bad, as is the case, for instance, among the inhabitants of the North Sea coast. So it is the overcrowded dwellings of the poor that we have to regard as the real breeding-places of tuberculosis; it is out of them that the disease always crops up anew, and it is to the abolition of these conditions that we must first and foremost direct our attention if we wish to attack the evil at its root, and to wage war against it with effective weapons.

This being so, it is very gratifying to see how efforts are being made in almost all countries to improve the domestic conditions of the poor. I am also convinced that these efforts, which must be promoted in every way, will lead to a considerable diminution of tuberculosis. But a long time must elapse ere essential changes can be effected in this direction, and much may be done meanwhile in order to reach the goal much more rapidly.

If we are not able at present to get rid of the danger which small and overcrowded dwellings involve, all we can do is to remove the patients from them, and, in their own interests and that of the people about them, to lodge them better; and this can be done only in suitable hospitals. But the thought of attaining this end by compulsion of any kind is very far from me; what I want is that the consumptives may be enabled to obtain the nursing they need better than they can obtain it now. At present a consumptive in an

advanced stage of the disease is regarded as incurable and as an unsuitable inmate for a hospital. The consequence is that he is reluctantly admitted and dismissed as soon as possible. The patient too, when the treatment seems to him to produce no improvement, and the expenses, owing to the long duration of his illness, weigh heavily upon him, is himself animated by the wish to leave the hospital soon. That would be altogether altered if we had special hospitals for consumptives, and if the patients were taken care of there for nothing, or at least at a very moderate rate. To such hospitals they would willingly go; they could be better treated and cared for there than is now the case. I know very well that the execution of the project will have great difficulties to contend with, owing to the considerable outlay it entails. But very much would be gained if, at least in the existing hospitals, which have to admit a great number of consumptives at any rate, special wards were established for them in which pecuniary facilities would be offered them. If only a considerable fraction of the whole number of consumptives were suitably lodged in this way, a diminution of Infection, and consequently of the sum-total of tuberculosis, could not fail to be the result. Permit me to remind you in this connection of what I said about leprosy. In the combating of that disease also great progress has already been made by lodging only a fair number of the patients in hospitals. The only country that possesses a considerable number of special hospitals for tubercular patients is England, and there can be no doubt that the diminution of tuberculosis in England, which is much greater than in any other country, is greatly due to this circumstance. I should point to the founding of special hospitals for consumptives and the better utilisation of the already existing hospitals for the lodging of consumptives as the most important measure in the combating of tuberculosis, and its execution opens a wide field of activity to the State, to municipalities, and to private benevolence. There are many people who possess great wealth, and would willingly give of their superfluity for the benefit of their poor and heavily afflicted fellow-creatures, but do not know how to do this in a judicious manner. Here is an opportunity for them to render a real and lasting service by founding Consumption Hospitals or purchasing the right to have a certain number of consumptive patients maintained in special wards of other hospitals free of expense.

As, however, unfortunately, the aid of the State, the municipalities, and rich benefactors will probably not be forthcoming for a long time yet, we must for the present resort to other measures that may pave the way for the main measure just referred to, and serve as a supplement and temporary substitute for it.

Among such measures I regard obligatory notification as specially valuable. In the combating of all infectious diseases it has proved indispensable as a means of obtaining certain knowledge as to their state, especially their dissemination, their increase and decrease. In the conflict with tuberculosis also we cannot dispense with obligatory notification; we need it, not only in order to inform ourselves as to the dissemination of this disease, but mainly in order to learn where help and instruction can be given, and especially

where the disinfection which is so urgently necessary when consumptives die or change their residences has to be effected. Fortunately it is not at all necessary to notify all cases of tuberculosis, nor even all cases of consumption, but only those that, owing to the domestic conditions, are sources of danger to the people about them. Such limited notification has already been introduced in various places—in Norway, for instance, by a special law, in Saxony by a ministerial decree, in New York and in several American towns which have followed its example. In New York, where notification was optional at first and was afterwards made obligatory, it has proved eminently useful. It has thus been proved that the evils which it used to be feared the introduction of notification for tuberculosis would bring about need not occur, and it is devoutly to be wished that the examples I have named may very soon excite emulation everywhere.

There is another measure closely connected with notification, viz., disinfection, which, as already mentioned, must be effected when consumptives die or change their residence, in order that those who next occupy the infected dwelling may be protected against infection. Moreover, not only the dwellings but also the infected beds and clothes of consumptives ought to be disinfected.

A further measure, already recognised on all hands as effective, is the instructing of all classes of the people as to the infectiousness of tuberculosis, and as to the best way of protecting oneself. The fact that tuberculosis has considerably diminished in almost all civilised States of late is attributable solely to the circumstance that knowledge of the contagious character of tuberculosis has been more and more widely disseminated, and that caution in intercourse with consumptives has increased more and more in consequence. If better knowledge of the nature of tuberculosis has alone sufficed to prevent a large number of cases, this must serve us as a significant admonition to make the greatest possible use of this means, and to do more and more to bring it about that everybody may know the dangers that threaten him in intercourse with consumptives. It is only to be desired that the instructions may be made shorter and more precise than they generally are, and that special emphasis be laid on the avoidance of the worst danger of infection, which is the use of bedrooms and small ill-ventilated workrooms simultaneously with consumptives. Of course the instructions must include directions as to what consumptives have to do when they cough and how they are to treat their sputum.

Another measure, which has come into the foreground of late, and which at this moment plays to a certain extent a paramount part in all efforts for the combating of tuberculosis, works in quite another direction. I mean the founding of sanatoria for consumptives.

That tuberculosis is curable in its early stages must be regarded as an undisputed fact. The idea of curing as many tubercular patients as possible, in order to reduce the number of those that reach the infectious stage of consumption, and thus to reduce the number of fresh cases, was therefore a very natural one. The only question is whether the number of persons cured in this way will be great enough to exercise an appreciable influence on the

retrogression of tuberculosis. I will try to answer this question in the light of the figures at my disposal.

According to the business report of the German Central Committee for the Establishment of Sanatoria for the Cure of Consumptives, about 5,500 beds will be at the disposal of these institutions by the end of 1901, and then, if we assume that the average stay of each patient will be three months, it will be possible to treat at least 20,000 patients every year. From the reports hitherto issued as to the results that have been achieved in the establishments, we learn further that about 20 per cent. of the patients that have tubercle-bacilli in their sputum lose them by the treatment there. This is the only sure test of success, especially as regards prophylaxis. If we make this the basis of our estimates, we find that 4,000 consumptives will leave these establishments annually as cured. But, according to the statistics ascertained by the German Imperial Office of Health, there are 226,000 persons in Germany over fifteen years of age who are so far gone in consumption that hospital-treatment is necessary for them. Compared with this great number of consumptives the success of the establishments in question seems so small that a material influence on the retrogression of tuberculosis in general is not yet to be expected of them. But pray do not imagine that I wish, by this calculation of mine, to oppose the movement for the establishment of such sanatoria in any way. I only wish to warn against the over-estimating of their importance which has recently been observable in various quarters, based apparently on the opinion that the war against tuberculosis can be waged by means of sanatoria alone, and that other measures are of subordinate value. In reality the contrary is the case. What is to be achieved by the general prophylaxis resulting from recognition of the danger of infection, and the consequent greater caution in intercourse with consumptives, is shown by a calculation of Cornet's regarding the decrease of mortality from tuberculosis in Prussia in the years 1889 to 1897. Before 1889 the average was 31·4 per 10,000, whereas in the period named it sank to 21·8, which means that, in that short space of time, the number of deaths from tuberculosis was 184,000 less than was to be expected from the average of the preceding years. In New York, under the influence of the general sanitary measures directed in a simply exemplary manner by Biggs, the mortality from tuberculosis has diminished by more than 35 per cent. since 1886. And it must be remembered that both in Prussia and New York the progress indicated by these figures is due to the first beginnings of these measures. Considerably greater success is to be expected of their further development. Biggs hopes to have got so far in five years that in the city of New York alone the annual number of deaths from tuberculosis will be 3,000 less than formerly. I take this opportunity of most urgently recommending Dr. Biggs' organisation to the study and imitation of all municipal sanitary authorities.

Now, I do indeed believe that it will be possible to render the sanatoria considerably more efficient. If strict care be taken that only patients be admitted for whom the treatment of those establishments is well adapted, and if the duration of the treatment be prolonged, it will certainly be possible

to cure 50 per cent., and perhaps still more. But even then, and even if the number of the sanatoria be greatly increased, the total effect will always remain but moderate. The sanatoria will never render the other measures I have mentioned superfluous. If their number become great, however, and if they perform their functions properly, they may materially aid the strictly sanitary measures in the conflict with tuberculosis.

If now, in conclusion, we glance back once more to what has been done hitherto for the combating of tuberculosis, and forward to what has still to be done, we are at liberty to declare with a certain satisfaction that very promising beginnings have already been made. Among these I reckon the consumption hospitals of England, the legal regulations regarding notification in Norway and Saxony, the organisation created by Biggs in New York, the sanatoria, and the instruction of the people. All that is necessary is to go on developing these beginnings, to test, and if possible to increase their influence on the diminution of tuberculosis, and wherever nothing has yet been done, to do likewise.

If we are continually guided in this enterprise by the spirit of genuine preventive medical science, if we utilise the experience gained in conflict with other pestilences, and aim, with clear recognition of the purpose and resolute avoidance of wrong roads, at striking the evil at its root, then the battle against tuberculosis, which has been so energetically begun, cannot fail to have a victorious issue.

The CHAIRMAN then rose and said: Lord Derby, Ladies and Gentlemen,—The discourse to which we have listened is full of profound interest from beginning to end. That which has, perhaps, most riveted the attention of us all has been the startling thesis that bovine tuberculosis is incapable of development in man. This is a matter of the most enormous importance. (Applause.) On the one hand, if this conclusion is correct, our means of prevention of tuberculosis will be greatly simplified. On the other hand, it would be a very serious and very grievous matter if the endeavours that are being made to provide purity of milk supply should be relaxed, and then, after all, it should turn out that the conclusion was not altogether correct. (Cheers.) I confess, for my own part, that the evidence which Dr. Koch has brought before us, that human tuberculosis cannot be communicated to the bovine species, seems exceedingly conclusive. Nevertheless, I agree with him that it is desirable that a matter of such enormous importance should be established by further inquiry. (Applause.) The converse proposition, that bovine tuberculosis is incapable of development in man, is a totally different one—(Applause)—and would not at all follow even if the other were admitted, as Dr. Koch himself is abundantly well aware. Let me take a single instance that occurs to me. To inoculate small-pox into the calf is a matter of extreme difficulty; it very rarely succeeds. Here and there a case of success had been published as an isolated matter, but the failures so greatly preponderated that pathologists of the highest eminence came to the conclusion that small-pox and cow-pox were two totally distinct diseases. It has now been shown that

this was an entire mistake. Let me mention one single—in itself conclusive—piece of evidence to that effect, evidence lately established by Dr. Monckton Copeman. He has found that while he cannot inoculate small-pox from man into a calf, he can infallibly do so into the monkey; and that then by inoculating from the pustule in the monkey to the calf, he as infallibly succeeds in producing a pustule in that animal, and that the result is the genuine cow-pox which can be used for preventive vaccination in the human subject. Here a virus which is practically incapable of direct inoculation from man into a certain other species becomes so altered in its properties by passing through a third kind of animal that it will grow readily in the species in which it could previously only develop with great difficulty, and when so modified can be transferred back to man with the utmost facility. Therefore this matter is one that requires its own special demonstration. It does not at all follow, because human tuberculosis will not develop in the cow, that therefore bovine tuberculosis may not develop in man. (Applause.) Now, on this point I must frankly confess the evidence which Dr. Koch has brought before us does not seem to me very conclusive. (Applause.) It is, as I understand him, to the effect that a primary intestinal tubercular lesion is a very rare occurrence in the child, in spite of the abundant occurrence of bovine tubercle bacilli in dairy products. But though the actual tubercular lesion in the intestine be as rare as Dr. Koch's statistics indicate, it surely must be admitted that tubercular disease of the mesenteric glands is quite a common disease in the child. (Applause.) And, as I learn, a considerable percentage of children that have died of tubercular disease have tubercle in their mesenteric glands, with or without intestinal tubercular lesion, as the only tubercular disease present: for example, without its presence in the lungs. I confess that to me it seems the natural interpretation, if this be the fact, that the tubercle bacillus passes through the intestinal wall without producing a distinct lesion of the mucous membrane—(Applause)—just as we know may occasionally be the case in typhoid fever. Although the intestinal mucous membrane is the chosen seat of the development of the bacillus of that disease, yet in certain exceptional cases it seems to pass through the intestinal wall without developing there, and is found in other organs. If that may be in the case of typhoid fever, how much more likely is it in the case of tuberculosis? The experiments which Dr. Koch alluded to in the latter portion of his discourse were, as I understand, to the effect that he inoculated material from human tubercular mesenteric glands into bovine animals, and failed to produce tuberculosis in them. These experiments, in the first place, are very few; and in the second place, if they were uniformly successful, it would not, to my mind, absolutely prove the point, because the tubercle bacillus derived from the ox or from the cow might have undergone a modification in the human system, just as the small-pox virus undergoes modification in the calf. (Applause.) Therefore, what was inoculated in such experiments might be, not the bovine tuberculosis, but the bovine tuberculosis transformed into human tuberculosis by residence in the human subject. (Applause.) I feel, therefore ladies and gentlemen, while I express myself very imperfectly—("No, no")—that

this is a matter which requires to be probed more deeply before this Congress, as I imagine, will give its assent to this proposition of Dr. Koch's. (Applause.) But I am sure that on a matter of such transcendent moment the Congress would like the opinions of experts—(Hear, hear)—and I will therefore call upon Professor Nocard to give us some words on this subject. (Loud applause.)

Professor NOCARD: Mr. President, Gentlemen,—I am much honoured and also moved by being called upon to join my congratulations to those which the President, with all the authority of his position, has just addressed to Professor Koch. I am very happy to congratulate the greatest bacteriologist in the world in the name of the French bacteriologists. (Applause.) I am also glad to convey to him the personal tribute of my admiration and gratitude, which date from a time, now long past, when I was first able to appreciate the elevation of his mind and all the nobility of his soul. (Loud applause.)

I am much pleased with Professor Koch's lecture. For a long time we veterinary surgeons have struggled against an ill-considered attempt to exaggerate the dangers of bovine tuberculosis. For ten years past we have protested against the useless seizure of considerable quantities of good meat, under the pretext that the animal it came from had some tuberculous nodules in the lungs or the ganglions.

This exaggerated movement has been checked. Professor Koch's address may have brought it to a full stop. I fear, however, lest the reaction may go too far in the other direction. One must not extricate oneself from one error to fall into a worse one. I do not desire that, after exaggerating the dangers of bovine tuberculosis, the fact that this tuberculosis is a danger should be denied. As a fact, bovine tuberculosis plays a very secondary part in the progress of human tuberculosis. We have always said so, and I appeal to M. Brouardel to confirm me in this; but so long as this danger exists at all, it is undeniable that it cannot be suppressed by denying it.

There are numerous proofs which show that sometimes the ox, which is generally so resistant to inoculation with human tuberculosis, may, nevertheless, develop it. There are recorded cases, first published by my chief, M. Chauveau, who, to his great regret, is not able to take part in this Congress. These cases were published at full length in the account given at the second congress on tuberculosis which took place at Paris in 1891. It was an account of some young calves, which had been inoculated through the digestive organs or by means of subcutaneous injections. A similar number of animals of the same age and the same origin served as evidence on the other side. Then, when those which had been treated with tuberculous matter from man exhibited lesions of more or less intensity in the mesenteric glands, the retro-pharyngeal or œsophageal glands, the others were absolutely healthy.

At the time when M. Chauveau made these experiments, there were no other means of experimenting than those; there was no tuberculin then, no means of making inoculations with pure cultures.

A short time after M. Guillard published the results of his memorable

experiments, and M. Chauveau was the first to give M. Guillard's doctrine the support of well-balanced and convincing experiments. (Applause.)

There are others; I know that several of my colleagues at this Congress are going to communicate the results of similar experiments, in which calves inoculated with the products of human tuberculosis have contracted the disease, and these men have brought evidence to support their views.

These cases are rare; I do not know why it is that this tuberculosis is rare, or why in certain cases one succeeds and in more frequent cases one does not succeed. I have no certain knowledge, but I cannot help thinking that it is due to the general law that any parasite, continuing a long time in certain subjects, acquires characteristics peculiar to those subjects which render it more dangerous to those subjects where it finds a favourable soil, and that it loses some of its qualities when brought in contact with a different soil.

Of this bacteriology furnishes many examples. The most remarkable is that of wheal-worm in pigs. Wheal-worm from pigs, inoculated in rabbits for the first time, does not always kill them. To make certain of killing a rabbit, several must be inoculated, and the bacillus transmitted from the first that dies into a second. It kills very quickly after a few transmissions; it finally becomes so virulent that the animal dies in a few hours after an inoculation of seven times transmitted tuberculosis. The virulence of the bacillus to the rabbit has, therefore, been considerably heightened, but it is remarkable to note that if this very virulent bacillus be readministered to pigs, it no longer kills; it has lost its danger for them.

You see that continuance in a certain soil gives the microbe special qualities not previously possessed by it.

But there are other facts that apply to a higher form of parasite, the tripanozome of the "dorine." "Dorine" is a malady caused by a tripanozome. The first man who studied it was an army doctor, M. Roger, who inoculated mice and rats with it, which had been killed; several days after they showed tripanozomes and their blood swarmed with that parasite.

The next to make observations on this disease were M. Schneider and another, army veterinary surgeons. They substituted for the mice and rats dogs, which proved to be equally susceptible to tripanozomes. After a succession of inoculations in dogs, a horse was inoculated with it and developed the malady, but after having succeeded in the horse this parasite, derived from dogs, was quite harmless to rats and mice, although, when inoculated directly into mice, it had killed them very speedily. This is a further example of qualities acquired by a microbe of a definite origin in its passage through a particular organism.

This is how I explain the fact that inoculation of cows with human tuberculosis is rarely successful, but though this may be, even though cows are impervious to human tuberculosis, one cannot conclude from that that the converse is true, and that man is impervious to bovine tuberculosis.

It is not possible to test this by experiments, but certain well-observed facts are recorded which indisputably prove the possibility of inoculation of tuberculosis in man from bovine animals; there are facts of undoubted inoculations,

nearly always of veterinary surgeons who have suffered from it. They have been inoculated while making post-mortem examinations on tuberculous cows. Then the disease has remained unnoticed for several months, but it has revealed itself sooner or later—its course has varied according to different circumstances, but it has finally appeared. Some of them have been cured; we have a colleague, also a veterinary surgeon, in Copenhagen, who is an example of its curability. Others are dead, having watched step by step the progress of the disease from the moment of inoculation to the summit of corresponding lung.

There are other records of inoculations from bovine animals to man through milk. There is one which is celebrated: it is that which Professor Koch, of Geneva, records of one of his own daughters. It was a family in which tuberculosis was unknown; one day one of the daughters fell ill and went into a decline. No one knew what was the matter with her for several months; at last an examination disclosed abdominal tuberculosis, which proved fatal. A post-mortem examination confirmed this diagnosis, pronounced abdominal tuberculosis proceeding evidently from an alimentary source. The family racked their memories, then it was recollected that they made an annual sojourn in a small hereditary estate in the mountains, and that this young girl was in the habit every morning, when there, of drinking a cup of new milk. A veterinary surgeon was sent for from Geneva, who administered tuberculin to all the animals; he found three or four infected; these were destroyed; there was one among them with the udder quite eaten away with tuberculosis. There are other proofs. I may remind you of a fact established by your chemist Thornton, and which proves the gravity of the danger. The general mortality in England from tuberculosis has diminished in fifty years by 45 per cent. Only one class of the population shows a contrary tendency, this is that of infants of tender years who die of abdominal tuberculosis. In this class the proportion has increased 27 per cent. as compared to a general diminution of 45 per cent. Why this contrast? Mr. Thornton answers unhesitatingly. The greatest efforts have been directed to the sanitation of houses, workshops, and towns, and thus a large proportion of the possibilities of infection through the respiratory organs, which are the most frequent in the adult, have been removed. But nothing has been done to diminish the chances of infection through the digestive channels, to which infants are most liable. Nothing has been done to ensure the sanitary condition of the milch cows or to prevent the sale of milk from those with tuberculous udders.

This fact proves the necessity of the measures taken and proposed against tuberculous milk cows, and I shall continue to cry, as I do now, "Mothers of families, do not give milk to your children without having it boiled." (Repeated applause.)

Professor BANG, rising to thank Professor Koch, said: As one of the foreign delegates, I ask permission to say a few words, in order to join with our President, Lord Lister, in most hearty thanks to Professor Koch for his paper. There is only one point in which I fear Professor Koch has gone a

little too far. I mean when he speaks of the non-necessity of taking measures against the tuberculosis of cattle. I fear his opinion will be rather detrimental to the work which goes on in many countries, in order to procure healthy milk for the public. And I think, although he has proved that there is only a very little danger of infecting cattle from tuberculous men, it is not certain that the opposite conclusion is right. I permit myself to remember the well-known cases of tuberculosis in men produced by inoculation from wounds. As such cases exist, and as we know all sorts of animals are capable of being infected through feeding from tuberculous milk, I think it will be wise to conserve our fear of tuberculosis. (Applause.)

Professor SIMS WOODHEAD said: Lord Lister, Lord Derby, Ladies and Gentlemen,—I esteem it a great honour to be allowed to add my few words of thanks to Professor Koch for the most able and exhaustive treatment of his subject that he has given us this afternoon. (Applause.) It would be impertinent on my part to apply to it any descriptive term save that of masterly, and I think I may be allowed to be your mouthpiece in this matter and to say that it has been a masterly exposition of the subject. (Applause.) I am sure we all admire the wise and humane manner in which he would treat this question. He is not to be deterred by difficulties; he goes to the root of the question from the very outset. There is one matter that has been mentioned by the other speakers to which I should like to add a word; and I do this simply because Professor Koch's word going out on this question is of such enormous weight, that I feel that anything that is to be said on the opposite side should, perhaps, be put rather strongly. (Hear, hear.) We believe, my lord, that if there had been no Koch there would have been no Tuberculosis Congress—(Applause)—that Koch, in coming here, has strengthened the hands of those who are working at this subject—has strengthened them enormously. But for that reason we wish to gain some little time during which we may examine carefully the subject which has been mentioned. I, for one, am convinced that bovine tuberculosis does play some part in the extension of human tuberculosis. (Applause.) I cannot look upon that specimen exhibited in the museum by Professor Crookshank, from an inoculation experiment, in which he took tuberculous material and injected it into the peritoneal cavity of a calf, without feeling there is much to be said against Professor Koch's thesis. Professor Crookshank, using the sputum of a tuberculous patient, produced a most distinct lesion at the point of inoculation, extending throughout the peritoneal cavity, and giving evidence at a later stage of tubercular infection in distant organs. This is one positive case, which I hold far overbalances a very large number of negative cases. (Applause.) Therefore, Sir, I wished to speak of this, and to ask whether it would not be possible in some way to give effect to Professor Koch's suggestion, as has been done in Germany, or that something similar should be done in this country; and whether it would not be possible for the members of this Congress, through representatives, to approach the Minister of Agriculture or the President of the Local Government Board—(Applause)—to see if

nothing can be done to settle this very important question. (Applause.) We cannot settle it by talking about it, and it is only by careful experiments, carried out on very definite lines, that we can convince ourselves of the accuracy or insufficiency of Professor Koch's statements. We are all bound to believe what Professor Koch states until we can prove by actual experiment that it is not so. We know he is a great experimenter, but even the greatest sometimes may have slight failures; or at any rate there may be misinterpretations or misconstructions—one knows not what; but at any rate I think it is right, as Professor Koch has told us what is being done in Germany, that somewhat similar steps should be taken in this country. It is a national question—nay, more than that, it is an international question; it is a question which affects the whole world, and I hold that we ought to take our part in arriving at some definite conclusion on the subject. In the meantime we have accepted this bovine tuberculosis as being a cause of human tuberculosis. There is a great deal of evidence in favour of the accuracy of this position. I myself have seen a considerable number of cases of disease of the mesenteric glands, in which there has been absolutely not a trace of tubercle in any other part of the body, in children. Therefore I cannot but feel that, whether it is of frequent occurrence or not, bovine tuberculosis is transmissible to the human subject, and for that reason we ought for the present—until we have made up our minds thoroughly on the subject—to continue to take such precautionary measures as have already been recommended.

I have got away from the subject, but I now thank Professor Koch most heartily for the magnificent address that he has given. I consider it very extraordinary that there should be such wonderful unanimity on the whole question, except on this single small point; and I think that Professor Koch is to be congratulated most heartily that he has convinced everyone here, except on this single but important point. (Loud applause.)

The CHAIRMAN, in conclusion, said: Ladies and Gentlemen,—Before we break up, I will ask you to pass an unanimous vote of heartiest thanks to him who has given us this splendid address. (Loud cheers.)

The vote was carried by acclamation, and the proceedings then terminated.

THIRD GENERAL MEETING.

The THIRD GENERAL MEETING was held in ST. JAMES'S HALL at 3 p.m. on Wednesday, JULY 24th, 1901.

The RIGHT HONOURABLE HENRY CHAPLIN, M.P., as Chairman, opened the meeting by saying:—I deem it a most distinguished honour that I am permitted to preside at one of the General Meetings of this Congress, whose proceedings at this moment create such exceptional interest, both in this and other countries. My duty upon this occasion is a very simple one. It is to introduce to you M. Brouardel, who will now address you. M. Brouardel is prominent among those distinguished men who from all portions of the world are present in London at this moment to deliberate upon the means of arresting what is one of the great scourges of the human race, although we are taught that it is also one which both can and ought to be controlled. M. Brouardel is the head of the Society of Medicine in Paris. He is the chief medical adviser of the French Government, and I may add that I think he is also perhaps the greatest living authority upon sanitary matters in Europe. Therefore, gentlemen, without further preface I will ask him to address you.

Professor BROUARDEL said: Monsieur le Président, Mesdames, Messieurs, —La tuberculose compte à son actif, suivant les pays, le sixième, le cinquième et quelquefois le quart de la mortalité totale. De tels ravages imposent à tous les peuples, à tous les gouvernements, le devoir de rechercher et d'appliquer les moyens capables d'enrayer la propagation d'une maladie qui à notre époque est le grand ennemi de la race humaine.

On peut s'étonner que le cri d'alarme ait été si long à se faire entendre, que pendant des siècles nos ancêtres aient assisté impassibles aux désastres dont ils étaient témoins. Plusieurs raisons expliquent cette indifférence apparente.

On tenait la lutte pour inutile, la maladie pour incurable; on ne connaissait pas ses moyens de propagation. Exagérant la portée de certaines observations on admettait que la phtisie est héréditaire. On s'endormait sur cette formule, qui servait d'oreiller à la paresse et dispensait de rechercher les origines du mal.

On tenait pour une légende les observations populaires, celles de Morgagni, qui au XVIIe siècle rapportait qu'en Italie on brûlait la literie des personnes mortes de phtisie et qui déclarait ne pas oser faire l'autopsie des tuberculeux.

Mais lorsque Villemin, le 5 décembre 1865, eut exposé à l'Académie de médecine les expériences qui établissaient la réalité de la contagion, lorsque notre illustre collègue R. Koch eut révélé et mis sous les yeux des médecins l'agent de cette contagion, chacun sentit qu'il s'ouvrait pour l'humanité une

nouvelle voie, et chez tous les peuples s'éveilla la volonté de mettre à profit pour le plus grand bien de tous les récentes découvertes de la science.

Vous, messieurs les Anglais, alors que les savants dont je viens de rappeler les noms n'avaient pas encore déchiré le voile qui nous cachait la vérité, vous aviez déjà commencé la lutte. Convaincus par l'observation des faits que la tuberculose se développe dans les logements sombres et humides, vous avez dès 1836, il y a près de soixante-dix ans, édicté une loi pour favoriser la construction de maisons salubres. Depuis lors votre zèle ne s'est pas ralenti. Votre législation compte plus de dix *acts* par lesquels, avec une persévérance admirable, vous avez assaini le logement du pauvre, l'atelier, la ville et le royaume tout entier. L'un de vous a caractérisé cet effort en le désignant sous le nom de la reine qui avait présidé à sa direction, il l'a appelé : *the Victorian era.* On ne saurait rendre à son Auguste Majesté un hommage qui aurait été plus gracieusement accueilli ; au nom de tous mes compatriotes je me joins à nos collègues anglais et j'adopte ce nom caractéristique de la lutte entreprise et du succès obtenu. Vous avez diminué votre mortalité par tuberculose de 40 p. 100. C'est votre honneur, ce sera le nôtre de vous imiter.

Messieurs les membres du Comité m'ont prié d'exposer dans cette conférence les moyens adoptés par les différentes nations pour lutter contre la propagation de la tuberculose. J'ai accepté, mais je dois de suite faire un aveu. J'ai trop compté sur mon désir de donner satisfaction au vœu que m'avaient adressé nos excellents collègues, et qui répond à de si légitimes préoccupations ; malheureusement les renseignements précis sont difficiles à réunir, le temps pour les vérifier était bien court, il y aura donc dans ce compte-rendu bien des lacunes, probablement même des erreurs. Je serais heureux que les unes et les autres me soient signalées, je le demande instamment à mes collègues ; s'ils écoutent mon appel, le vœu formulé par les membres du Comité sera réalisé grâce à eux, grâce à vous, et chaque nation pourra trouver dans les œuvres de ses voisins des enseignements et des motifs d'émulation utiles à tous.

Messieurs, les principes sur lesquels on s'est basé pour lutter contre la tuberculose sont identiques dans tous les pays. Sur cette question, le corps médical du monde entier est en parfait accord.

La tuberculose est évitable, elle est curable.

Les moyens employés pour faire application de ces deux formules sont les mêmes dans tous les pays, mais les uns ou les autres ont pris le premier rang, suivant l'impulsion donnée par les savants des diverses nations, suivant les mœurs et les lois en vigueur.

Messieurs, permettez-moi de m'arrêter un instant sur ce dernier mot. Lorsqu'une loi intervient dans nos actes journaliers, lorsqu'elle trouble des habitudes invétérées et qu'elle doit être appliquée au sein du foyer domestique, elle ne peut être observée que lorsque l'opinion publique la réclame, lorsque les convictions de tous sont faites, que chacun connaît le danger de ses

habitudes vicieuses et est prêt à les réformer personnellement, et à exiger de son voisin qu'il agisse de même.

Il en est ainsi en Angleterre; M. d'Estournelles de Constant, chargé d'affaires de France à Londres, écrivait en 1892 :

"Les Anglais tâchent d'assainir le plus possible leur maison, et non seulement leur maison, mais leur rue, leur quartier, leur ville, le pays tout entier. Les propriétaires s'associent pour prévenir toute négligence dont puisse souffrir la communauté, négligence qui exposerait son auteur et ses voisins, d'abord aux dangers d'une maladie, ensuite à d'autres risques matériels; car le prix des loyers est en raison directe de la bonne réputation de la localité: telle ville, tel quartier, telle maison est-elle salubre? C'est la première question que pose tout futur acquéreur ou locataire.

"Les particuliers sont donc les promoteurs de toutes les mesures d'hygiène qui leur paraissent opportunes; ils en décident l'adoption et en surveillent l'exécution. L'État n'intervient pas sans nécessité absolue."

Cette méthode me semble la seule efficace, et la première règle est de faire l'opinion du peuple. Elle est indispensable pour réussir.

Comment faire cette *éducation antituberculeuse?*

En Angleterre, en mai 1899, vous avez fondé, sous la présidence de son Altesse le Prince de Galles, une association nationale pour éviter la phtisie et les autres formes de la tuberculose. (*The national association for the prevention of consumption and other forms of tuberculosis.*) Son but est d'obtenir la prévention par l'instruction populaire. Vous avez rédigé des plaquettes courtes, pratiques, qui peuvent servir de modèle: je citerai: *The crusade against consumption* (48 pages, prix 6 pence); *Milk and tuberculosis; Fresh air and ventilation; How to prevent consumption*, etc. On les répand à profusion.

A la tête de cette association, je trouve des noms que je salue avec respect: ceux de tous les membres qui ont provoqué la réunion de ce congrès.

L'Allemagne, après avoir constitué les sociétés formées pour la construction des sanatoriums, a fondé les sociétés pour la *propagation de l'idée*, pour la vulgarisation des notions de salubrité. Ce sont de petites sociétés disséminées dans les diverses localités, se groupant en sociétés provinciales. Elles aussi publient des brochures de vulgarisation:

En Belgique, une ligue nationale contre la tuberculose a son siège à Bruxelles. Chaque province a une section indépendante.

En Norwège, le Storthing a voté 40,000 couronnes pour l'impression et la distribution d'un écrit populaire du Dr Klaus Haussen sur la tuberculose, et 2000 couronnes pour créer une bourse de voyage accordée aux médecins qui désirent se perfectionner dans l'étude du fonctionnement des sanatoriums.

En France, la Société de préservation contre la tuberculose par l'éducation populaire a groupé, sous la direction du Dr Peyrot, ceux dont la parole a autorité sur la jeunesse française; je cite les noms de MM. Lavisse, Matignon, Victorien Sardou, Landouzy, etc.

Beaucoup d'entre nous sommes allés dans les différents départements, où

de toute part surgissent des œuvres anti-tuberculeuses, exposer les règles de la prophylaxie. J'ai profité de ce que j'ai l'honneur d'être président de l'Association polytechnique, pour instituer une instruction populaire à Paris. Cette année, quatre-vingt-huit conférences sur la tuberculose ont été faites aux douze mille élèves de cette association.

Ainsi dans tous les pays pénètre dans la masse du public cette notion que par des soins personnels, par la propreté, on peut éviter la contagion, et cette autre notion que je regarde comme aussi importante : qu'un tuberculeux n'est dangereux que si on ne prend pas autour de lui et s'il ne prend pas lui-même les précautions nécessaires pour mettre à l'abri du contage ses parents, ses amis, ses camarades d'atelier.

Il ne faut pas créer la *tuberculophobie*, faire du malade un *paria*. Bien avant nous, un tuberculeux a vécu de longs mois sans contaminer sa femme ou ses enfants.

Le danger, c'est le crachat, qui porte en lui des milliards de germes contagieux. Cracher sur le sol autour de soi est une coutume dégoûtante et dangereuse ; le jour où elle aura disparu la tuberculose décroîtra rapidement.

En Amérique, cette règle a été sanctionnée par une loi. Elle a été promulguée à la suite d'une campagne de presse. L'Américain est grand liseur de journaux et il a vite compris les conséquences de cette déplorable habitude. On cite même, comme exemple, le cas d'un millionnaire, M. Bradbury, qui, puni une première fois d'une amende, fut condamné a vingt-quatre heures de prison pour avoir récidivé.

A Sydney on frappe de 25 francs d'amende les personnes qui crachent dans la rue.

En Europe nous sommes moins sévères, mais non moins convaincus du danger.

Quel sera en effet le rôle de ce crachat dans la propagation ultérieure de la maladie ? Il sera bien différent suivant les cas.

Recueilli, capté dans un crachoir personnel ou commun mais aseptique, détruit par incinération ou par tout autre procédé, il ne menace personne.

Projeté dans un milieu sec et très bien éclairé, soumis aux rayons du soleil, il perdra bientôt ses propriétés dangereuses.

Mais s'il séjourne dans un milieu humide, mal éclairé, il conservera longtemps toute son activité.

Aussi, c'est dans les habitations sombres, peu aérées, mal éclairées, que les germes de la tuberculose font leurs plus nombreuses victimes.

Tous les peuples l'ont constaté, mais l'Angleterre a un double mérite, elle a compris la première l'importance du problème, elle l'a résolu d'une façon qui lui est absolument personnelle, et elle a réussi.

Voyant que le logement insalubre est un des agents les plus actifs de la propagation de la tuberculose, les législations des différents pays ont visé cette insalubrité, et ont fait des lois pour détruire les logements insalubres. Vous, dès 1836, vous avez dirigé vos actes législatifs pour *construire* des logements salubres.

En Angleterre, en 1836, la législation intervient pour favoriser les associa-

tions qui construisent des maisons pour ouvriers. Les *building societies* sont des caisses d'épargne qui procurent des maisons à leurs membres, et actuellement elles comptent plus d'un million d'adhérents dans le Royaume-Uni.

Les *Labouring classes' lodging houses Acts* (1851–1866–1867) forment un ensemble de lois qui stimulent les paroisses et les municipalités des villes de plus de 10,000 habitants à construire des maisons salubres.

Les *Acts for the removal of nuisances* (1852–1866–1874) accordent aux autorités locales le droit d'inspection des maisons ouvrières, et fixent les amendes pour contraventions aux lois et règlements.

Les *Artizans' dwellings Acts* (1868–1882), appelés également *Torrens's Acts*, "ont pour but primordial la réparation et la démolition des maisons insalubres; ils permettent aussi de supprimer les bâtiments *obstructeurs*, c'est-à-dire ceux qui enlèvent l'air et le jour à d'autres maisons, et empêchent la ventilation.

Les *Artizans' and labourers' dwellings improvement Acts* (1875–1882) obligent les municipalités à démolir les logements insalubres et à fournir un logement aux personnes qui, par suite de cette mesure, se trouveraient sans abri.

Cette action du gouvernement a suscité l'intervention de bienfaiteurs dont les noms doivent être conservés dans la mémoire de tous ceux qu'intéresse la santé publique.

En première ligne je citerai celui de *Peabody;* de 1862 à 1869, date de sa mort, ce généreux donateur consacra 500,000 livres à la construction de maisons qu'on loue aux travailleurs pauvres pour un prix minime, mais suffisant cependant pour que ces locataires ne se considèrent pas comme logés gratuitement.

Actuellement 18,000 ouvriers habitent ces maisons. La progression suivie jusqu'à ce jour permet de prévoir que cinquante ans après la fondation 120,000 ouvriers profiteront de cette création.

Citons également l'œuvre de *Miss Octavia Hill*, et *l'artizans', labourers' and general dwellings Company*, fondée par des ouvriers en 1867 et qui possède maintenant plus de 6000 maisons, etc.

En Allemagne l'initiative privée a donné sur ce point de moins bons résultats; le professeur Brentano de Strasbourg et M. Miquel, ministre des Finances de Prusse, pensent que l'État et la commune doivent intervenir pour améliorer l'habitation de l'ouvrier, parce que seuls ils sont assez puissants.

Cependant quelques sociétés de construction se sont fondées, notamment la *Berliner Baugenossenschaft.*

La Belgique est une des nations qui s'est mise à l'œuvre avec le plus de zèle pour assurer aux ouvriers des habitations salubres.

La loi de 1889 a créé dans chaque arrondissement administratif des Comités pour favoriser la construction et la location d'habitations ouvrières salubres.

Le Danemark est le pays dans lequel les sociétés de construction ont pris le plus grand développement. En 1600, Christian IV avait donné l'exemple en faisant construire des maisons avec jardins pour les employés de la maison,

Une association fondée par le Dr Ulrich possède actuellement vingt mille membres, neuf cents immeubles ayant une valeur de 10 millions de francs. Ces maisons forment le quartier le plus salubre de Copenhague.

Je n'ai pas à rappeler ici les efforts faits en France pour arriver au même résultat: la loi de 1850 sur les logements insalubres, les travaux de Du Mesnil sur le logement du pauvre à Paris, la loi du 30 novembre 1894 qui détermine les attributions de l'État et de l'initiative privée dans la construction des maisons ouvrières. L'un des délégués français, M. le prince d'Arenberg, donnera avec plus de compétence que moi toutes les indications précises sur ce sujet.

Tous les auteurs s'accordent pour constater que dans ces maisons salubres la mortalité est inférieure à celle de la ville dans laquelle elles sont construites. La maison salubre est donc anti-tuberculeuse.

Mais si les germes tuberculeux tombent dans une maison mal éclairée, humide, ils conservent longtemps toute leur virulence; que la maison soit à la ville où à la campagne, peu importe. Dans ces milieux la population est souvent très dense; il n'est pas rare à Paris de voir une chambre occupée par cinq, six, huit et parfois douze personnes. Les contacts entre elles sont incessants, les chances de contagion augmentent par ce fait même; à l'étroitesse du logis se surajoute la malpropreté des occupants, l'impossibilité, devrais-je dire, de maintenir une propreté suffisante.

Il se crée ainsi de petits foyers tuberculeux, qui du logis envahissent la maison tout entière; les ouvriers et les employés emportent dans leurs ateliers ou dans leurs bureaux les germes de la maladie et font bientôt de la ville un gros foyer tuberculeux.

Mais que l'on ne s'y trompe pas, une ville n'est pas insalubre toute entière, elle ne forme pas un bloc irréductible. J'ai démontré ailleurs que dans une même ville des quartiers contigus ont une mortalité tuberculeuse qui varie du simple au double, et que la mortalité tuberculeuse des quartiers de Paris varie de 10 à 100 p. 10,000 habitants. Enfin dans chaque quartier il y a les maisons tuberculisantes, ce sont elles qu'il faut rechercher, qu'il faut faire disparaître.

Surtout il ne faut pas en construire de nouvelles aussi insalubres que celles qui constituent un danger pour une cité, pour tout un pays. Dans la plupart des villes de tous les pays les projets de construction des maisons neuves doivent être soumis à l'approbation de l'autorité sanitaire locale. C'est une mesure essentielle, on ne saurait trop insister sur son observation.

Les méfaits du logement insalubre ne se bornent pas au danger de contagion sur lequel je viens d'insister. L'absence d'air, de lumière, agit sur la nutrition de ceux qui habitent ces logements, les enfants s'étiolent, dépérissent, les hommes les plus robustes ne résistent pas, ces logements font de tous les êtres humains qui les habitent la proie désignée à toutes les maladies infectieuses, et si nous ne considérons que la phtisie ils en font des prédisposés à la tuberculose, transforment l'homme le plus vigoureux et le mettent dans le même état que ceux qui sont nés de parents tuberculeux. Pour ces

derniers, l'hérédité n'est pas directe, on ne naît pas tuberculeux mais tuberculisable.

Les lois anglaises, allemandes, italiennes, françaises, etc., que je rappelai il y a un instant, sont donc légitimes, elles doivent être appliquées avec persévérance, surtout en ce moment où les mouvements économiques, semblables pour tous les peuples, tendent à concentrer dans les villes la plus grande partie de nos populations. En veillant à la salubrité de celles-ci on protège la santé de la patrie tout entière.

Ces logements sont encore responsables d'autres désastres. Dans ces demeures obscures, encombrées, la propreté est difficile sinon impossible à sauvegarder, leur séjour est désagréable, l'ouvrier n'y passe que le moins de temps possible, il y prend ses repas, il y dort, mais il donne le reste de son temps disponible au cabaret. C'est avec raison que J. Simon disait : "Le taudis est le pourvoyeur du cabaret," et nous pouvons ajouter : le cabaret est le pourvoyeur de la tuberculose.

L'*alcoolisme* est en effet le plus puissant facteur de la propagation de la tuberculose. L'homme le plus vigoureux devenu alcoolique est sans résistance devant elle. Je ne puis pas établir en ce moment la comparaison entre les législations en vigueur dans les différents pays, entre celles qui sont proposées, entre les œuvres privées, les associations, les sociétés de tempérance, le temps me fait absolument défaut. Mais je puis dire que dans le monde entier s'élève en ce moment un cri de désespoir en constatant les désastres causés par l'alcoolisme. Je veux citer seulement deux statistiques, elles sont éloquentes. Celle de Tatham montre que la mortalité moyenne étant représentée par 100, celle occasionnée par la tuberculose est pour les—

Garçons de cabaret	257
Marchands ambulants	239
Ouvriers des docks	176
Musiciens ambulants	174
Coiffeurs	149
Brasseurs	148
Ramoneurs	141
Cabaretiers	140
Cochers	124
Porteurs de charbon	116
Bouchers	105

Baudran (de Beauvais) a montré que les cartes de mortalité par tuberculose et celles de la consommation de l'alcool en France sont presque superposables.

Il est arrivé sur ce point aux résultats suivants :

Décès par tuberculose pour 10,000 habitants.	Consommation annuelle de litres d'alcool par habitant.
30 à 40	12,47
40 à 50	15,21
50 à 60	14,72
70 à 80	16,36
80 à 90	17,16
Plus de 90 décès	50,79

Toutes les mesures d'ordre gouvernemental ou d'ordre privé qui pourront être prises pour limiter les ravages de l'alcoolisme seront nos plus précieux auxiliaires dans la lutte contre la tuberculose, mais c'est une question trop vaste pour en faire l'étude en ce moment ; je tiens toutefois à signaler une erreur que dans les différents pays commettent trop facilement les hommes chargés de gérer les finances de l'État. Ils calculent volontiers la somme que l'État encaisse par l'impôt de l'alcool : il faudrait en déduire ce que coûte à la commune la famille de l'alcoolique ruinée, ses enfants dégénérés, infirmes, scrofuleux, épileptiques, voués à l'asile.

Cette invasion de l'alcoolisme doit donc apparaître aux yeux de tous comme un danger public, et il est nécessaire d'essayer d'inculquer aux masses cette vérité que dans le monde l'avenir appartient aux peuples sobres.

Les dangers qui entourent l'homme dans un logement insalubre sont les mêmes lorsque, pour son travail, ses fonctions, son plaisir, par maladie ou par contrainte, un homme vit tout ou partie de la journée dans un milieu où d'autres personnes se trouvent réunies ; les conditions des habitations surpeuplées et même insalubres se trouvent réalisées. Bien portant, ses compagnons sont un danger pour lui ; malade, il est dangereux pour eux.

Or les conditions de la vie moderne forcent l'homme à vivre dans ces milieux :

Enfant, il est pris par l'école ; adulte, par la caserne ; ouvrier, par l'atelier ; étudiant, par les cours, les bibliothèques, les laboratoires ; employé, fonctionnaire, par les bureaux et les locaux administratifs ;

S'il se déplace, il utilise les voitures, les compartiments des chemins de fer trop souvent souillés ;

A l'hôtel où il descend, des malades l'ont souvent précédé et à leur départ aucun moyen de préservation n'a été pris pour mettre le nouvel arrivant à l'abri d'une contagion possible ;

Indigent et malade, il entre à l'hôpital, où l'environnent toutes les menaces de contamination.

Ce péril de la vie en commun, inhérent aux progrès même de la civilisation, va sans cesse croissant ; il en est la rançon et explique l'augmentation de plus en plus menaçante de la tuberculose.

Placés en face de ceux qui sont prédisposés par leurs origines familiales, par l'insalubrité de leurs logements, on a dans certains pays admis que le devoir était de rechercher les moyens de relever ces organismes chancelants et de les mettre en état de résistance vis-à-vis des dangers qui les menacent. On a pensé avec raison que c'était sur l'enfant et l'adolescent que l'action serait plus efficace. Grâce au concours de quelques villes et de l'initiative privée, en Italie, en France et dans d'autres pays on a créé des *sanatoriums marins* pour enfants scrofuleux et chétifs. La France en possède quatorze, y reçoit plus de deux mille enfants par an ; les résultats obtenus sont excellents. Qu'il me soit permis de rappeler que c'est surtout à notre vénéré maître M. le Dr Bergeron, à son activité, à sa propagande qui ne s'est jamais lassée que nous devons ce succès.

Inspirés par la même pensée, plusieurs pays ont créé des colonies de vacances, organisé des séjours temporaires dans des localités placées au bord de la mer ou dans les montagnes.

Tout ce qui sera fait dans cette direction sauvera de la contagion les privilégiés qui grâce à la générosité des particuliers pourront profiter de ces séjours reconstituants.

En 1893 une dame, Mme Hervieu, inspirée par les mêmes sentiments pour les enfants et les adolescents et leurs parents, créa à Sédan l'œuvre des jardins ouvriers. Ceux-ci occupent plus de 2000 mètres carrés autour de la ville; 321 familles comprenant 1251 personnes les habitent. La société fournit les instruments, graines, engrais aux familles locataires.

En 1894, le P. Volpette, jésuite, créa l'œuvre des jardins ouvriers de Saint-Étienne. Elle met 18 hectares à la disposition de 410 familles comprenant 2460 personnes. Sur le terrain loué on élève des maisons ouvrières. Une dizaine a déjà été construite par les locataires.

Il y a des jardins ouvriers à Bercy; il s'en crée en ce moment à Fontainebleau, à Villeurbanne près de Lyon.

Avant d'aborder la question de la cure de la tuberculose, permettez-moi de dire quelques mots des mesures qui sont organisées contre la contagion tuberculeuse par les aliments.

Depuis que Chauveau a eu démontré que la pénétration des germes tuberculeux avec les aliments pouvait déterminer la tuberculisation par la voie intestinale, l'attention s'est portée sur les précautions à prendre pour empêcher la consommation des *viandes* et du *lait* provenant d'animaux tuberculeux.

Pour la viande, dans les grandes villes la sécurité est établie par la surveillance installée dans les abattoirs. En Belgique, une loi a organisé l'inspection même dans les campagnes, mais sauf dans ce royaume partout ailleurs, je crois, les tueries particulières échappent à toute surveillance et c'est là qu'on abat les vaches phtisiques, les porcs ladres, les animaux ayant une maladie quelconque pouvant entraîner le rejet à l'inspection. Ces viandes nuisibles entrent ensuite dans la consommation, soit comme viandes fraîches, soit sous forme de pâtés ou de saucissons, dont n'ont pas été exclus les viscères tuberculeux.

Un autre danger est le colportage des viandes en morceaux. Il existe surtout dans les grandes villes; les bouchers reçoivent chaque jour des quartiers de viande qui leur sont adressés par des bouchers de province. Ces viandes échappent à tout contrôle.

Sans exagérer le danger de la propagation de la tuberculose par la viande, on doit reconnaître qu'il existe. Il est facile par une loi de mettre les populations à l'abri de ce mode de contamination. La Belgique nous a donné l'exemple.

L'usage alimentaire du lait des vaches atteintes de mammite tuberculeuse est bien établi. Votre grand hygiéniste, Thorne-Thorne, signalant qu'en Angleterre la mortalité générale des adultes par la phtisie a diminué depuis 1850 de 45 p. 100, déplore de voir, depuis cette même date, la mortalité

infantile par tuberculose augmenter de 27 p. 100. Cette augmentation est d'après lui presque exclusivement due à la tuberculose abdominale, contractée par ingestion de lait contaminé, par les nourrissons de moins d'un an; car en Angleterre il n'existe pas de surveillance des vacheries.

En France, la loi semble permettre cette surveillance, elle est confiée aux maires, mais pour mettre la loi à exécution, il faut que les maires connaissent les vaches atteintes de mammite tuberculeuse, et ils ne peuvent les connaître que si les propriétaires les leur signalent. Or les laitiers ne déclarent guère leurs vaches suspectes que quand leur lait est tari, c'est à dire alors qu'elles ne sont plus dangereuses pour le consommateur.

Il est bon d'ajouter que, dans les grandes exploitations, le lait de diverses provenances est mélangé et il suffit qu'une seule vache d'un des fournisseurs ait de la mammite tuberculeuse, pour que tout le lait ainsi mélangé devienne dangereux.

Il faut, pour remédier à ce mode de propagation, adopter de stricts moyens de surveillance, appliqués déjà depuis plusieurs années en Danemark, en Suède, en Norwège, au grand bénéfice de la santé publique.

En attendant la mise en pratique des mesures nécessaires, il faut faire connaître à la population que le moyen le plus simple d'éviter le danger créé par le lait consiste à le faire bouillir, en dépit du préjugé trop répandu, qui veut, à tort, que le lait bouilli soit moins nutritif et indigeste.

Lorsqu'un homme est atteint de tuberculose on doit faire tous ses efforts pour le guérir, car *il est curable*. Cette formule n'est pas une banalité.

La notion de la guérison possible de la tuberculose est bien ancienne, on la trouve déjà dans Hippocrate. "*Le phtisique, s'il est traité dès l'abord, guérit*," disait le père de la médecine.

Après vingt-cinq siècles nous reprenons cette formule, elle a même encore pour quelques-uns une apparence de paradoxe. Et cependant tous les anatomo-pathologistes en ont confirmé l'exactitude. En 1838, un de vos grands médecins, Carswell, écrivait: "L'anatomie pathologique n'a peut-être jamais donné de preuves plus décisives de la guérison d'une maladie que celles qu'il nous a données pour la phtisie pulmonaire."

Laënnec, Nat. Guillot, Letulle ont établi que dans plus de la moitié des autopsies on trouvait des lésions tuberculeuses anciennes, guéries.

"Ces chiffres, dit le Dr Ribard, par la similitude même de leurs résultats, sont d'une grande éloquence. Ils nous montrent très clairement que la moitié des hommes réputés bien portants et non tuberculeux, mourant de vieillesse ou de cause fortuite, ont, à un moment donné de leur vie, été touchés par la tuberculose, mais ont guéri.

"Il y a donc beaucoup d'atteints, et aussi beaucoup de guéris, puisque la moitié du genre humain a des tubercules, mais les supporte sans même se douter de leur présence. Telle est la signification vraiment réconfortante du résultat des autopsies."

Quant à moi qui, à la Morgue de Paris, pratique fréquemment les autopsies d'individus morts accidentellement, je puis affirmer que, dans la

moitié des cas, si l'individu autopsié habite Paris depuis une dizaine d'années, je trouve des lésions tuberculeuses guéries, soit par transformation crétacée, soit par cicatrisation fibreuse.

J'ajouterai que ces vieillards, ces personnes que les uns et les autres nous avons autopsiés dans les hospices, dans les hôpitaux et à la Morgue, n'ont certainement pris, pour se guérir, aucune des précautions que nous imposons à nos malades. Malgré des habitudes hygiéniques souvent déplorables, leur résistance personnelle a suffi.

Ces résultats anatomiques ont encore une autre signification. Ces lésions, dans l'immense majorité des cas, ne sont pas celles d'une phtisie au début, s'étant manifestée par de petits foyers disséminés, elles sont les cicatrices de vastes foyers, parfois de larges cavernes complètement cicatrisées. La phtisie est donc curable, elle l'est même dans ses périodes les plus avancées.

La curabilité possible, fréquente même, de la tuberculose n'est pas seulement affirmée par les anatomo-pathologistes, elle l'est par tous les médecins qui se sont spécialement occupés de phtisiologie. Grancher l'a résumée dans cette formule : " La tuberculose est la plus curable des maladies chroniques."

Puisque le tuberculeux est curable, il faut organiser les soins qu'on lui donne, de façon à tout faire pour le guérir.

La conviction de la curabilité doit tout d'abord s'imposer à l'esprit du médecin et se traduire par une profonde modification dans les mœurs médicales.

Autrefois, se croyant impuissant devant la tuberculose, le médecin n'avait pas, dès le début de la maladie, le courage d'informer le malade ou sa famille de la nature de l'affection. Il estimait que son devoir était d'entretenir les illusions de la famille et du malade, et la maladie évoluait jusqu'au moment où tout espoir devait être abandonné.

Aujourd'hui nous demandons au médecin, qui doit, nous l'espérons, être convaincu que la tuberculose est curable, de faire l'inverse. S'il est vrai qu'à toutes ses périodes la tuberculose peut guérir, il est certain que cette possibilité se réalise surtout quand on fait suivre au malade les médications nécessaires dans la période de prétuberculose, alors que les lésions sont minimes et que l'individu peut trouver, dans son organisme même, les ressources nécessaires à la lutte.

Le médecin doit donc prévenir le malade et sa famille qu'il a une affection grave, mais curable. S'il ne l'avertit pas à temps, c'est à dire dès le début, il s'expose à ce que le malade ou sa famille lui fasse plus tard le reproche d'avoir trahi sa confiance.

Mais cette transformation dans les habitudes médicales ne sera possible que si une organisation qui, nous l'espérons, sera bientôt un fait accompli, permet au médecin d'indiquer au malade, en même temps que la nature de son mal, les moyens que la science a mis à sa disposition pour le combattre.

Quels sont ces moyens? Comment les applique-t-on dans les différents pays?

Je ne m'occuperai dans cette revue que des tuberculeux ouvriers et des

employés, je laisse volontairement de côté les malades riches, ceux-ci trouveront d'ailleurs dans cet exposé indication des règles qu'ils devront observer.

Les moyens à préconiser varient suivant l'époque à laquelle est parvenue la maladie, ils varient aussi si le malade est célibataire, marié, père de famille.

On peut schématiquement distinguer trois périodes. Dans la première, l'ouvrier tousse, il a un rhume. Que fait-il actuellement? Ou il ne s'occupe pas de ce petit incident, ou il demande au pharmacien une potion, un remède contre cette toux. Les jours, les semaines, les mois s'écoulent et, suivant l'intempérie des saisons, la maladie s'aggrave ou a des rémissions suivies de retours offensifs. Puis la fièvre, le dépérissement surviennent, l'ouvrier ne peut plus continuer à travailler. Pour lui la maladie commence, pour nous il entre dans la deuxième période, celle dans laquelle les soins les mieux entendus resteront probablement inutiles.

C'est donc la première période qui nous intéresse surtout, celle dans laquelle notre intervention peut être efficace.

Quel est l'organisme par lequel nous pouvons être utile à cet homme dans la première période?

L'Allemagne a organisé, dans les grandes villes, des policliniques pour tuberculeux, dans lesquelles un personnel médical choisi, muni de l'outillage nécessaire, donne ses soins aux tuberculeux qui viennent le consulter, pendant tout le temps de la maladie, ou seulement pendant la période qui précède le moment où le malade veut entrer dans un sanatorium et où celui-ci peut lui ouvrir ses portes.

Un Comité de patronage, composé de personnes bienfaisantes, parmi lesquelles les dames sont en grand nombre, s'occupe du malade à domicile, donne des conseils à la femme, veille à la propreté du logis, indique les mesures prophylactiques nécessaires.

Dans la mesure du possible, la misère inséparable du chômage est écartée par l'appoint qu'apporte une caisse de secours de famille, alimentée comme celle des sanatoriums.

M. Calmette a été frappé par les mêmes considérations, mais, et c'est ce qui fait l'originalité de sa proposition, il demande qu'au lieu d'attendre que l'ouvrier vienne demander l'avis des médecins, on aille au-devant de lui, on l'invite à venir à un dispensaire analogue aux policliniques allemandes.

Voici en quels termes il exposait son projet en 1899 :

" Je pense qu'au lieu d'attendre que l'ouvrier tuberculeux aille consulter le médecin et soit acculé au chômage, on devrait ériger en principe la nécessité d'*aller à lui* et de lui prêter assistance, avant même qu'il puisse s'apercevoir qu'il est gravement atteint. Je voudrais qu'on pût *dépister* chez le malade la tuberculose tout au début de son évolution, et qu'on s'efforçât aussitôt de lui donner les conseils et les soins qui peuvent lui être utiles, en le conservant le plus souvent à sa famille et à son milieu."

M. Calmette a réalisé son projet; il a créé à Lille un dispensaire antituberculeux désigné sous le nom Émile Roux. Le succès a dépassé ses espérances.

Inspiré par les mêmes préoccupations, M. le Dr Bonnet a fondé à Paris,

dans un des quartiers de Montmartre, un dispensaire analogue ; d'autres sont en voie de formation à Paris, l'un d'eux à Vaugirard, avec le concours du Conseil municipal.

L'expérience nous a montré que les ouvriers ne craignent pas de venir à ces dispensaires : les uns s'y rendent parce qu'ils toussent, les autres parce qu'ils se savent déjà atteints.

Mais, pour dépister ces malades, il faut, je dirai presque que c'est le point capital, avoir un ou plusieurs agents-ouvriers, des contremaîtres-ouvriers, si cela est possible. Ce sont eux qui, les premiers, remarquent que leurs camarades toussent ; ils leur indiquent le chemin du dispensaire. Pénétrés des dangers qui naissent du mauvais entretien d'un atelier ou d'un chantier, ils surveillent les soins de propreté, trop négligés jusque-là ; ils font pratiquement l'éducation antituberculeuse autour d'eux.

Ceux qui vont au dispensaire reçoivent des médecins les soins nécessaires, apprennent le danger de la dissémination des crachats, de l'alcoolisme, etc. Ils y sont surveillés, on leur donne de jus de viande, un ou deux repas, suivant les ressources dont disposent les membres de la société. On vient au secours de leur famille ; on surveille, au point de vue hygiénique, le domicile du malade ; on écarte de lui, autant que possible, la misère qui le menace.

C'est parmi ces clients que l'on reconnaît ceux qui ne peuvent guérir que s'ils sont envoyés au *sanatorium*.

Si l'ouvrier ou l'employé est célibataire et si on peut lui donner à cette période l'entrée du sanatorium, les chances de guérison sont très nombreuses ; pour que l'ouvrier père de famille puisse bénéficier du même espoir, il faut que pendant la durée de sa cure sa famille soit à l'abri du besoin, que toute inquiétude sur le sort des siens soit absolument écartée de son esprit.

La *caisse de secours* pour la famille est l'organe le plus essentiel d'un sanatorium. Le sanatorium est indispensable dans bien des cas pour compléter l'œuvre du dispensaire.

Je n'ai pas à retracer les règles qui doivent présider à l'édification et au fonctionnement d'un sanatorium.

Rappelons-nous seulement qu'ils doivent être fermés, aseptiques, disciplinés et que la formule de Dettweiller est restée intacte : repos physique et moral, suralimentation, aération continue.

C'est en Allemagne que le système a été appliqué avec le plus d'ardeur ; la bienfaisance privée, les corporations, les industriels, les communes, l'État ont concouru avec une générosité admirable à leur création ; voyons les résultats obtenus.

L'Allemagne possède 83 sanatoriums populaires ouverts ou prêts à fonctionner. Elle y reçoit par an 12,000 tuberculeux. Ils ont été construits par les assurances régionales, par les caisses de maladies, par les industriels qui se sont unis pour fonder des sanatoriums pour leurs ouvriers, par les communes qui se sont concertées dans ce but ; c'est ce dernier système qui est le plus en progrès. Dans certains districts on a établi une taxe personnelle dès un pfennig.

L'État a fondé quelques sanatoriums pour ses employés : l'adminstration forestière, le ministère des chemins de fer, l'État de Hambourg.

La commission du budget du Reichstag a résolu de créer des sanatoriums d'État dépendant du ministère de l'Intérieur.

La durée du traitement est en moyenne de quatre-vingt-dix jours ; l'expérience a montré qu'il était utile aux malades de faire, pendant l'année qui suit la cure, un nouveau séjour de quatre semaines au sanatorium.

Dans ces conditions quelle est la durée des succès obtenus ? Parmi ceux (72 p. 100) qui quittent le sanatorium dans un état jugé favorable, on a constaté que les malades qui travaillaient encore en 1900 étaient pour ceux qui étaient sortis du sanatorium—

en 1896	46 p. 100
1897	47 —
1898	58 —
1899	60 —

La dépense moyenne d'entretien pour un tuberculeux pendant les trois mois de séjour s'élève à huit francs par jour y compris le secours de famille qui représente le tiers de cette somme.

Dans un compte-rendu très intéressant, M. le Dr Pannwitz relève les *desiderata* signalés par divers médecins. Ceux-ci regrettent qu'on n'ait presque rien fait pour les femmes et pour la classe moyenne. Les docteurs Schrœder et Naumann Reiners font remarquer à juste titre que dans la classe moyenne les symptômes initiaux sont plutôt constatés, qu'elle est plus prévoyante et qu'à la sortie ses membres peuvent en général ne pas se livrer au surmenage de travail qui dans la classe ouvrière compromet souvent le succès.

L'expérience a montré que comme l'avait dit Sersiron, tant vaut le médecin, tant vaut le sanatorium, aussi pour recruter le médecin des sanatoriums on va créer un enseignement spécial.

Le Dr Pannwitz insiste sur ce fait que les sanatoriums pour leur bon fonctionnement économique ne doivent être ni éloignés des villes ni placés sur des hauteurs ; il exprime le vœu que leur construction soit moins onéreuse ; actuellement elle correspond à 10,000 marks par lit, il estime qu'elle ne devrait pas dépasser 4000 marks.

L'expérience a montré enfin que le voisinage d'un sanatorium n'expose la localité dans laquelle il est placé à aucun danger. Ce qui est dangereux c'est le phtisique en liberté qui dissémine partout ses crachats, c'est la maison où on reçoit des phtisiques sans y organiser la discipline. La surveillance est indispensable.

Le Dr Pannwitz cite deux villages dans le Hartz qui ont été décimés par ces créations dangereuses ; Lopo de Carvalho fait la même remarque pour Guarda en Portugal.

Pour eux et pour moi toutes les maisons où l'on reçoit des tuberculeux doivent être soumises à la surveillance de l'autorité.

L'exemple de l'Allemagne fut suivi. L'Angleterre, l'Écosse, l'Australie, le Canada, élevèrent quelques sanatoriums encore peu nombreux,

En Autriche, Schrœtter réussit à faire construire le sanatorium d'Alland qui compte 300 lits. Le chevalier Von Kusy transforma en petits sanatoriums, des baraquements du type Ducke.

Aux États-Unis on sépara des quartiers d'hôpitaux pour en faire des hôpitaux de consomption. On créa une trentaine de petits sanatoriums, l'association de l'Alabama en construisit un pour les prisonniers, le département de la Marine en créa un pour la marine ; New-York possède actuellement six sanatoriums.

Grâce à la munificence du tzar, la Russie a édifié en 1897 l'établissement Halila ; depuis 1898, le sanatorium de Tactzi avec deux pavillons de 20 lits pour les hommes et de 20 lits pour les femmes. A Salta, la princesse Barjatinska a fondé un établissement pour les élèves du gymnase, etc.

Le roi de Suède a consacré à la construction de trois sanatoriums les 2,300,000 couronnes offertes en souscription à l'occasion de son jubilé, le Parlement a voté 800,000 couronnes dans le même but et l'État a donné les terrains nécessaires à l'édification de ces trois sanatoriums.

Le Danemark possède déjà deux sanatoriums, le Parlement s'occupe d'un projet de construction de sanatoriums populaires.

L'Italie, les Pays-Bas, la Norwège ont obéi à la même impulsion.

En France, plusieurs sanatoriums sont ouverts : celui de Hauteville, près de Lyon, celui d'Angicourt pour Paris. Dès 1876, nous avions créé l'asile de Villepinte, puis celui d'Ormesson pour les adolescents tuberculeux. Citons encore les colonies agricoles du Cannet, l'asile Jean Dollfus à Cannes, le sanatorium girondin, celui de Cimiez, près Nice, celui d'Argelez et enfin ceux qui viennent d'ouvrir ou qui vont ouvrir : Lille, Nancy, Orléans, Versailles, Amiens, Le Havre, Marseille, à Paris le sanatorium de Bligny, Rouen, etc.

Tous les peuples ont donc obéi à la même généreuse impulsion, on peut entrevoir le moment où le malheureux tuberculeux, abandonné depuis des siècles à son triste sort, trouvera, s'il n'est encore que dans les deux premières périodes de son mal, par les dispensaires et les sanatoriums, les moyens d'espérer toujours et de réaliser souvent sa guérison.

Si le malade a franchi ces deux premières périodes, s'il vient frapper à la porte de l'hôpital, on ne doit pas oublier qu'il peut encore guérir, à condition qu'on lui impose la conviction qu'il en est ainsi. Il faut le recevoir dans des salles isolées, humainement disposées, pour qu'il ne soit pas découragé par le spectacle de l'agonie de ses camarades.

Les règles de cet isolement ont été formulées par Grancher et Thoinot, pour le tuberculeux, pour le personnel qui l'a soigné, vous les avez realisées dans les hôpitaux de consomption. A Brompton, en vingt ans, on a soigné 15,000 tuberculeux. Personne, parmi les médecins, les directeurs ou les surveillants, n'a été infecté. Cette affirmation est répétée par le Dr Williams, médecin de l'hôpital, par Mœller et par Masbrenier.

Messieurs, lorsque le Comité m'a demandé de présenter un tableau, que malheureusement je n'ai pas su rendre plus court, des œuvres qui dans les

différents pays ont été créées pour lutter contre la tuberculose, il m'a prié également de considérer la question au point de vue international.

Je ne crois pas que l'on puisse prendre dans cet ordre d'idées des mesures semblables à celles que l'on a instituées pour empêcher l'invasion d'un pays par la peste, le choléra ou la fièvre jaune. Je ne sais pas comment un médecin pourrait affirmer que le voyageur qui se présente à la frontière ou dans un port n'est pas tuberculeux.

Mais l'entente entre les nations pourrait se faire sur un autre terrain. Il serait désirable que toutes les mesures de désinfection soient prises dans les wagons de chemins de fer, dans les paquebots, dans les hôtelleries, pour que le voyageur ne se trouve pas en présence des germes de contagion. C'est là un intérêt véritablement international.

Le ministre des Travaux publics de France vient d'adresser aux compagnies de chemins de fer une circulaire visant les précautions à prendre pour faire disparaître ou au moins diminuer les chances de la contagion tuberculeuse.

Dans divers pays, aux États-Unis en particulier, les hôtelliers qui reçoivent un tuberculeux sont tenus d'en faire la déclaration à la municipalité. La désinfection de la chambre est obligatoire avant qu'un autre voyageur y pénètre.

Le ministre de l'Intérieur de l'empire allemand a édicté des mesures plus sévères encore.

Tout médecin ayant à traiter un malade atteint de tuberculose pulmonaire ou laryngée doit en aviser par écrit la police, dès que le diagnostic a été porté.

Aussitôt après la mort d'un tuberculeux, la chambre où a eu lieu le décès et les effets du malade doivent être soumis à la désinfection.

Les tenanciers des hôtels, maisons meublées, asiles et autres établissements publics, sont tenus de signaler immédiatement tout cas de maladie tuberculeuse survenu dans les établissements qu'ils dirigent.

Déclaration, désinfection, assainissement des hôtels et des wagons et paquebots, telles sont les questions d'ordre international qui pourraient être utilement débattues par les représentants des diverses nations.

Monsieur le Président, Messieurs,—

Si je cherche à caractériser l'enseignement qui ressort de l'ensemble de ces efforts faits dans tous les pays pour lutter contre la tuberculose, je puis dire que l'expérience nous montre que nous devons par la parole, par les journaux, par des brochures, faire pénétrer dans l'esprit de tous qu'on peut éviter et comment on peut éviter la contamination tuberculeuse, que de plus on peut la guérir.

Si la conviction de nos concitoyens est faite sur ces deux points l'initiative privée se sentira orientée, les œuvres antituberculeuses déjà si nombreuses se multiplieront, se coordonneront; les communes, les provinces, l'État ne pourront pas résister au mouvement qui entraînera le peuple tout entier, et nous pourrons espérer que réunies dans un même effort toutes les nations

civilisées réussiront à éteindre la peste la plus cruelle qui ait jamais frappé autour de nous nos enfants, nos amis, celle qui compromet l'avenir de nos patries.

Messieurs, il y a dix ans je disais au Congrès d'hygiène de Londres:

"Quand, à l'aurore d'un siècle, on peut inscrire le nom de Jenner, et à son déclin celui de Pasteur, l'humanité tout entière peut se réjouir; il a été fait pour elle, contre la misère, la maladie et la mort plus que dans aucun des siècles précédents."

Honneur au XIXe siècle, mais celui qui vient de naître est dès sa première année le témoin du plus grand effort qui ait été tenté en faveur de la médecine publique; qu'aucun obstacle ne nous arrête, et puisse celui qui résumera dans cent ans l'œuvre du XXe siècle constater que la conviction qui nous anime n'est pas restée stérile, que le succès a répondu à l'espoir des nations que vous, messieurs les membres du Comité, vous avez conviées à se réunir à vous pour atteindre le but le plus élevé, le plus noble qui ait jamais fait battre le cœur dans une poitrine humaine.

[*Translation.*]

Mr. President, Ladies and Gentlemen,—Mortality from tuberculosis varies according to the country. In some cases it is accountable for a sixth, a fifth, and sometimes a fourth of the total mortality. Havoc such as this makes it compulsory that all nations and governments should strictly inquire into, and adopt, measures to arrest the propagation of a disease which in these days is the greatest enemy of the human race.

The wonder is that the voice of alarm has been so long in making itself heard, and that for centuries our ancestors have looked impassively on the disasters going on around them. There were several reasons for this apparent indifference. The struggle was considered useless; the disease incurable; it was not known how it spread. Exaggerating the import of some observations, it was agreed that phthisis is hereditary. They were lulled to sleep by this formula, which served as a pillow for idleness and exempted them from investigating the origin of the mischief. Popular observations were looked on as old wives' tales, *e.g.*, Morgagni's, who, in the seventeenth century, stated that in Italy it was customary to burn the bedding of persons who had died from phthisis, and who declared that he was frightened to make a post-mortem on cases of phthisis.

But when, on December 5th, 1865, Villemin showed experiments at the Academy of Medicine which proved the real presence of the contagion, when our illustrious colleague, Professor Robert Koch, had discovered and demonstrated to the medical world the agent of this contagion, everyone felt that a new way was opened to humanity, and every nation wished to profit for the public good by the recent scientific discoveries.

Before the scientists I have just mentioned had actually made known their discoveries, you English people, gentlemen, had already begun the struggle,

Convinced by observation that tuberculosis thrived in dark and damp dwellings, in 1836—nearly seventy years ago—you passed a law providing for the construction of healthy houses. And since that date your zeal has not abated. You have, with admirable perseverance, passed more than ten Acts of Parliament, you have rendered salubrious the dwellings of the poor, the workshop, the town, and the whole kingdom. This effort has been described by the name of the Queen who presided over its direction—the Victorian Era. No greater homage could be paid to Her Gracious Majesty, and in the name of all my countrymen I unite with my English colleagues in adopting this characteristic name for the crusade that was undertaken, and for the success obtained. You have diminished mortality in England from tuberculosis by 40 per cent. Yours is the honour. It will be ours to follow in your steps.

I was asked by the Committee to make the subject of my address the measures adopted by different nations for the prevention of consumption. This I agreed to do, but I must at the same time make a confession. I depended too much on my wish to please my excellent colleagues, whose request seemed so feasible; but, unfortunately, precise information is difficult to collect, and the time at my disposal for its verification was very short, so that there will, I fear, be lacunæ, probably even errors. I shall be pleased in either case to have my attention drawn to them, and I entreat my colleagues to do so; if they comply, thanks to them and to you, the wish expressed by the Committee will be carried out, and every nation may, by hearing what its neighbours have done, gain instruction and be inspired by motives of emulation beneficial to all.

Gentlemen, the grounds for the prevention of tuberculosis are identical in every country. On this question the entire medical profession of the world is united.

Tuberculosis is avoidable and curable.

The methods used to bring this about are the same in all countries, but according to the impetus given to the movement by the scientists in the different nations, and according to the customs and laws in force, some nations have taken the first rank.

Allow me, gentlemen, to dwell a moment on legislation. It is only possible to bring a law into force that interferes with our daily life, that disturbs inveterate habits, and that has to be carried out in the bosom of the domestic hearth, when it is called for by public opinion: when all are convinced of its benefits, and everyone recognises the danger of his vicious habits, and is ready personally to reform them and to require his neighbour to do the same.

This is the state of things in England. M. d'Estournelles de Constant, Chargé d'Affaires for France in London, wrote in 1892 as follows:—"English people leave no stone unturned to render not only their houses healthy, but their streets, districts, town, and whole country. Owners of property unite in preventing negligence detrimental to the community, which would in the first place expose its author and his neighbours to risk of illness, and then

to other material risks; for the rents are in direct proportion to the good reputation of the locality. Is the sanitation of such a town, neighbourhood, or house good? is the first question asked by an intending purchaser, householder, or lodger.

"Private individuals, therefore, are the promoters of sanitary measures which they consider appropriate; they decide on their adoption and see that they are carried out. The State never interferes except in case of absolute necessity."

This system seems to me the only efficacious one, and the first thing which is indispensable is to educate public opinion.

How is this *anti-tubercular education* of public opinion to be carried out?

You founded in England, in 1899, under the presidency of His Royal Highness the Prince of Wales, a National Association for the Prevention of Consumption and other forms of Tuberculosis. Its object is to carry out prevention by educating the masses. You drew up short, practical pamphlets. As a model I may quote "The Crusade against Consumption" (48 pages, price 6*d.*), "Milk and Tuberculosis," "Fresh Air and Ventilation," "How to prevent Consumption," etc., and distributed them freely.

At the head of this Association I find names that I recognise with respect, those of the gentlemen who inaugurated this Congress.

Germany founded societies for the construction of sanatoria, and then societies for the propagation of the idea, to popularise sanitary ideas. These societies are small and scattered in different localities, forming provincial groups. They too publish popular pamphlets.

In Belgium there is a national league against tuberculosis, with its seat in Brussels. Each province has an independent branch.

In Norway the Störthing voted forty thousand crowns for the purpose of printing and distributing a popular work on tuberculosis, by Dr. Klaus Haussen, and two thousand crowns to form a travelling fund for doctors wishing to gain information about the management of sanatoria.

In France the society for the prevention of tuberculosis by popular education, under the direction of Dr. Peyrot, has collected together those who can teach with authority. I refer to such men as Lavisse, Matignon, Victorien Sardou, Landouzy, etc.

Many of us have addressed meetings explaining rules of prophylaxis in the provinces, where, on every hand, anti-tuberculous movements are springing up. I made use of my position as President of the Polytechnic Association to institute popular education in Paris. This year eighty-eight lectures on tuberculosis have been given to twelve thousand pupils of this association.

Thus gradually in all countries the public are beginning to realise that personal care and cleanliness are necessary to obviate contagion, and are also realising that other idea—to my mind equally important—that a consumptive patient is only dangerous if the necessary precautions are not taken around him, and if he himself does not take them to protect his relatives, friends and fellow-workmen from contagion.

Tuberculophobia must not be produced, the patient must not be made a

pariah. Long before our time a consumptive person has lived for many months without contaminating wife and children.

The danger is in the sputum, which contains thousands of contagious germs. To expectorate on the ground is a disgusting and dangerous habit. Once this habit has quite disappeared, tuberculosis will decrease rapidly.

In America this habit is against the law, and there has been a press campaign against it. The American is a great newspaper reader, and he quickly realised the consequences of this deplorable habit. As an example may be quoted the case of a millionaire—Mr. Bradbury—who, punished for the first offence by a fine, on repeating it was sentenced to twenty-four hours' imprisonment.

At Sydney, a fine of £1 is imposed on persons for spitting in the streets.

In Europe, though we are not so strict, we are none the less convinced of this danger.

What *rôle*, as a matter of fact, does this sputum play in the subsequent propagation of the disease? It varies in different cases.

Collected and shut up in a private, or common but antiseptic, spittoon, destroyed by incineration or some other measure, it is dangerous to no one.

Thrown into dry and well-lighted surroundings, exposed to the rays of the sun, it will soon lose its dangerous properties.

But if it remains in damp and dark surroundings, it will maintain its activity for a long time.

Thus it is that tuberculosis claims more victims from gloomy, ill-ventilated, dark dwellings.

All nations have recognised this, but England has the double merit of recognising the primary importance of this problem and of having solved it successfully in a manner peculiarly her own.

Recognising that insalubrious dwellings are one of the most potent agents in the propagation of tuberculosis, the legislatures of the different countries have kept this cause of insalubrity well in view, and have made laws ordering the destruction of unhealthy dwellings. You, since 1836, have directed your legislation towards the construction of healthy abodes.

In England, in 1836, legislation intervened in favour of associations for building workmen's dwellings. Building societies are savings banks to procure houses for their members, and have actually more than a million members belonging to them in the United Kingdom.

The Labouring Classes' Lodging-Houses Acts (1851–1866–1867) are a collection of laws urging parishes and corporations of more than 10,000 inhabitants to construct sanitary houses.

The Acts for the Removal of Nuisances (1852–1866–1874) give the local authorities the right to inspect working-houses, and fix fines for contravention of laws and regulations.

The Artisans' Dwellings Acts (1868 to 1882), also called *Torrens' Acts*, have as their primary object the reparation and demolition of insalubrious houses; they also suppress obstructive buildings, such as take away light and air from other houses and prevent ventilation.

The Artisans' and Labourers' Dwellings Improvement Acts (1875 to 1882) oblige municipalities to pull down unhealthy dwellings and to find a lodging for those persons who, in consequence of this, are rendered homeless.

This action on the part of the Government has led to the intervention of benefactors, whose memory should be kept green in the minds of those interested in public health.

First, I will mention *Peabody*. From 1862 to his death in 1869, this generous man gave £500,000 for building houses, to be let to poor workmen at a very low rate, but enough was to be charged to make the man feel independent of charity.

As a result, 18,000 workmen are housed in these dwellings. Judging by the advance made to date, it may be prophesied that fifty years after their foundation 120,000 workmen will be benefited by these dwellings.

I must also mention Miss Octavia Hill's work and the Artisans', Labourers' and General Dwellings Company, founded by workmen in 1867, and who now have more than 6,000 houses, etc.

In Germany private initiative has not been so successful. Prof. Brentano, of Strasbourg, and Mr. Miquel, Minister of Finance for Prussia, think that State and parochial intervention is required to ameliorate the condition of workmen's dwellings, because none but they are powerful enough.

Nevertheless, some building societies have been founded, notably the "Berliner Baugenossenschaft."

Belgium has been one of the most enthusiastic nations in taking up the movement in favour of healthy dwellings.

The law passed in 1889 formed committees in each administrative district to build and let healthy houses to workmen.

In Denmark, building societies have flourished best of all. In 1600 Christian IV. set the example by erecting houses with gardens for the employés of his house.

Dr. Ulrich founded an association which has as many as 20,000 members, and 900 real estates worth ten million francs. These houses compose the healthiest part of Copenhagen.

It is not my business now to speak of what has been done in France—the law of 1850 dealing with unhealthy dwellings, Du Mesnil's work on lodging the poor in Paris, the law passed November 30th, 1894, which defines the powers of the State and of private initiative in the construction of workmen's dwellings. One of the French delegates, the Prince d'Arenberg, will give precise information about this much more ably than I can.

All authors agree that mortality is lower in these healthy houses than in the town in which they are built. The healthy house therefore is anti-tubercular.

But if tubercular germs fall in an ill-lighted, damp house, they maintain their activity for a long time, whether the house is in town or country. In these surroundings population is often very dense. It is no uncommon thing to see one room in Paris occupied by five, six, eight, and sometimes twelve persons. They are continually coming in contact with one another; chances of

contagion are increased by this fact alone, and in addition to the limited space has to be added the dirtiness of the occupants, or, as I should say, the impossibility of keeping sufficiently clean.

Thus small tuberculous foci are created which invade the whole house; the workmen and employés carry the germs of disease into their workshops and offices, and soon make a large tuberculous focus of the town.

But I do not wish to mislead. A town is not *in toto* unhealthy, and does not form an irreducible block. I have shown elsewhere that, in the same town, quarters adjoining one another have mortality from tuberculosis which varies to the extent of as much again, and that mortality from tuberculosis in districts in Paris varies from 10 to 100 per 10,000 inhabitants. However, in every quarter there are hot-beds of tuberculosis. These are what we have to find and demolish.

Above all else, new ones equally unhealthy must not be constructed, for they are a danger to city and country. In most of the towns in all countries building plans of new houses have to be submitted for approval to the local sanitary authorities. It is a necessary precaution which cannot be too strictly enforced.

The evils of an unhealthy dwelling are not confined to the risk of contagion just referred to. The want of air and light acts on the nutrition of the inmates, children go off, pine away, the strongest men cannot withstand it, every human being living in these places is the destined prey of infectious diseases; and if we only consider phthisis they become predisposing causes of consumption, transforming the strongest man and putting him on a par with the condition of those born of tuberculous parents. In the latter heredity is not direct—one is not born tuberculous, but predisposed to tuberculosis.

The English, German, Italian, French, and other laws that I referred to a moment ago are therefore lawful, and should be enacted perseveringly, especially at a moment when there is a tendency in all countries to concentrate in the towns the greater part of our populations. By looking after the salubrity of the towns the health of the whole land is protected.

Unhealthy dwellings cause other disasters. Dark and crowded as they are, cleanliness is difficult, if not impossible to preserve; they are not pleasant to pass the time in, and the workman stays in his home as little as possible; he eats there and sleeps there, but the rest of his time is spent in the public-house. J. Simon was right in saying: "The wretched lodging is the purveyor of the public-house," and we can add to it that the public-house is the purveyor of tuberculosis.

In fact, alcoholism is the most potent factor in propagating tuberculosis. The strongest man, who has once taken to drink, is powerless against it. Time is too short for me now to draw comparisons between the laws in force in different countries, those which are proposed, private efforts, associated efforts, and temperance societies. But I can say that a universal cry of despair rises from the whole universe at the sight of the disasters caused by alcoholism. I will quote but two sets of statistics, but they speak for

themselves. Tatham's show that, the mean mortality being represented by 100, that caused by tuberculosis is in—

Barmen	257	Sweeps	141
Pedlars	239	Publicans	140
Dock Labourers ...	176	Coachmen	124
Strolling Musicians ...	174	Coalmen	116
Hair Dressers ...	149	Butchers	105
Brewers	148		

Baudran, of Beauvais, has shown that mortality from tuberculosis and from alcoholism are nearly identical.

In this connection he obtained the following results:—

Deaths from Tuberculosis in 10,000 inhabitants.	Annual consumption of litres of alcohol per head.
30 to 40	12·47
40 ,, 50	15·21
50 ,, 60	14·72
70 ,, 80	16·36
80 ,, 90	17·16
More than 90	50·70

Any measures, State or individual, tending to limit the ravages of alcoholism will be our most precious auxiliaries in the crusade against tuberculosis, but the question is too large a one to deal with here. Still, I should like to draw attention to a mistake made too easily in the different countries by ministers who have the charge of the financial department of the State. They like to calculate the sum the State gets from the duty on alcohol, but they should deduct from it the cost to the community of the family of the ruined drunkard, his degenerate, infirm, scrofulous and epileptic children, who must have shelter.

This invasion of alcoholism ought to be regarded by everyone as a public danger, and this principle, the truth of which is incontestable, should be inculcated into the masses, that the future of the world will be in the hands of the temperate.

The dangers surrounding a man in an unhealthy home are the same when for his work, his duties, his pleasure, through illness or under constraint, a man lives all or part of the day in a centre where other people are assembled, where unhealthy conditions and overcrowding exist. If he is well, his companions are dangerous to him; if he is ill, he is dangerous to them.

Now the conditions of modern life compel a man to live in such centres. As a child there is the school; as an adult, the barracks; a workman, the workshop; a student, the lecture-hall, the libraries, laboratories; the employé or official, the bureau and the offices.

If he moves about he uses vehicles, railway carriages, too often contaminated.

At the hotel where he stops he has frequently been preceded by a sick person, and no precautions have been taken to protect the new arrival from possible contagion.

If he is poor and ill he goes into a hospital, where he is surrounded by contamination on every hand.

This peril from common life, inseparable from advance in civilisation, is continually growing: it is the ransom, and accounts for the threatening increase in tuberculosis.

Brought face to face with those predisposed by their family history, by the unhealthiness of their dwellings, it has been recognised as a duty in some countries to make an attempt to restore these tottering frames, and to render them capable of battling with the dangers that threaten them. It was adjudged with reason that childhood and youth would be the easiest period of life to influence. Thanks to the help of some towns and of private initiative in Italy and France and in other countries, sanatoria by the seaside have been established for weakly and scrofulous children. There are fourteen in France, which accommodate more than 2,000 children a year, and with excellent results. May I be allowed to recall the fact that we owe this success chiefly to the unfailing activity and propaganda undertaken by our revered master, Dr. Bergeron.

Inspired by the same idea, some countries have started holiday colonies and temporary visits to places by the sea or in the mountains.

Everything done in this direction will help to rescue from contagion those who, thanks to the generosity of private individuals, can profit by these health-restoring visits.

In 1893, with the same object in view, Mme. Hervieu started at Sedan working gardens for children, young people and their parents. These gardens occupy more than 2,000 square metres around the town, and accommodate 321 families, composed of 1,251 persons. The society supplies tools, seeds and manure to each family.

In 1894 the Jesuit Father Volpette started the working gardens at St. Etienne. They cover about forty-two acres and accommodate 410 families, composed of 2,460 persons. On the ground let working houses are built. About ten have already been built by the lodgers. There are working gardens at Bercy, and some are now being made at Fontainebleau and at Villeurbanne, near Lyons.

Before touching on the question of the cure of tuberculosis I should like to say a few words about measures adopted to prevent tuberculous contagion by food.

Since Chauveau showed that it was possible for tuberculous germs in food to produce tubercles in the intestinal tract, attention has been turned to precautions for preventing the consumption of *meat* and *milk* from tuberculous animals.

As far as meat is concerned, surveillance of the slaughter-houses in large towns achieves this. In Belgium this measure is also made to apply to the country; but I do not know of any other kingdom where private slaughter-houses are inspected, and in them it is that phthisical cows, measly pigs, and diseased animals of any kind are slaughtered and are able to escape inspection. This injurious food is consumed either as fresh meat or in the form of pâtés or sausages from which the tuberculous viscera have not been removed.

Another danger is the hawking of meat in pieces. It is rife especially in the large towns. Butchers receive daily quarters of meat despatched by provincial butchers. This meat escapes inspection.

With no wish to exaggerate the danger of the propagation of tuberculosis by meat, it cannot be overlooked. It is easy, by means of legislation, to protect the population from this method of contamination. Belgium has set us the example.

That the milk of cows with tuberculous inflammation of breast is used is very clear. Your great hygienist, Sir R. Thorne-Thorne, while pointing out that in England mortality in general of adults from phthisis has diminished since 1850 from forty-five per hundred, regrets to see that from the same date infantile mortality from tuberculosis increased by twenty-seven per hundred. According to him, this increase is entirely due to tuberculosis in the abdomen, caused by ingestion of contaminated milk in infants under a year old; for in England cow-houses are not inspected.

In France, to all appearance, the law allows this surveillance. It is entrusted to mayors, but to put the law into execution the mayors must know the cows suffering from tuberculous mammitis, and they can only know this if the owner reports it. Now, the dairies only report their cows when their milk is dry, when, in fact, they are no longer dangerous to the consumers.

It is well to add that in large concerns the milk from different sources is mixed, and one cow only need be the victim of tuberculous mammitis in order to contaminate all the milk with which its milk is mixed.

To prevent this method of propagation, strict inspection measures should be adopted, such as have been in use for several years in Denmark, Sweden, and Norway, to the great advantage of public health.

Until such necessary measures are actually adopted, there only remains the simple mode of avoiding risk from milk by boiling it, and this should be widely made known, in spite of a too wide-spread prejudice which wrongly holds that boiled milk is less nutritious and indigestible.

If a man is the victim of tuberculosis, everything possible should be done to cure him, for *he can be cured.* There is no doubt of this.

The idea that tuberculosis can be cured dates back to Hippocrates: "Phthisis, if treated early enough, gets well," said the Father of Medicine.

After twenty-five centuries we are supporting the same theory, which to some may appear paradoxical. Still, all anatomo-pathologists have confirmed its truth. In 1838, Carswell, one of your distinguished physicians, wrote, "Pathological anatomy has never, perhaps, given a more decided proof of the cure of a disease than it gives in cases of pulmonary phthisis."

Laennec, Nat. Guillot, Letulle proved that in more than half the post-mortems made old healed tuberculous lesions were to be found.

"These figures," says Dr. Ribard, "from the similarity even of their results, are striking. They show very clearly that half the men said to be well and non-tuberculous, dying of old age or fortuitous cause, have at a certain time in their life been attacked by tuberculosis, but have recovered.

"Many are therefore affected, and many recover, if half the human race has tubercles and goes on living without discovering them. This result obtained about post-mortems is really very comforting."

As for my personal experience at the Morgue in Paris, where I frequently make post-mortems on accidental deaths, I can state that in half the cases, if the person on whom the post-mortem is made has lived in Paris for about ten years, I find healed tuberculous lesions, either in the form of cretaceous transformation or fibrous cicatrisation.

I may add that it is quite certain that such cases of old people, and those on whom autopsies are held in almshouses, hospitals, and the Morgue, have certainly taken none of the precautions we consider necessary. In spite of often deplorably dirty habits, the system has been strong enough to resist the ravages of the disease.

These anatomical results have also another meaning. These lesions, in the majority of cases, are not phthisis in an early stage manifested by small disseminated foci; they are cicatrices of large foci, sometimes of wide, completely cicatrised cavities. Phthisis therefore is curable, even in its most advanced stages.

This is not only maintained by anatomo-pathologists, but by all medical men who have made a special study of the disease. Grancher sums the matter up thus: "Tuberculosis is the most easily cured of chronic diseases."

As a tuberculous patient *can* be cured, everything possible must be done to bring this about by careful organisation.

The doctor, being himself firmly convinced that his patient can be cured, will make the necessary modifications in his way of looking at the disease.

Formerly, when a doctor thought that he could do nothing for a patient suffering from tuberculosis, he had not the courage to tell the patient or his friends the nature of the disease. He considered it his duty to keep up appearances until the time came when the case was hopeless.

Now we require a doctor, who is convinced, we trust, that tuberculosis can be cured, to behave in just the opposite way. If it is true that in every stage tuberculosis can be cured, it is certain to be true if the patient has been made to take the necessary precautions in the pre-tuberculous stage, when lesions are very small and when there is sufficient power of resistance in the patient's system.

The doctor should tell the patient and his family that he has a serious disease, but that it is curable. If he does not tell him at once, he renders himself liable to be reproached by the patient or his friends for having deceived them.

This change of demeanour in the medical man will only be possible when a society is formed, which I hope will not be long, enabling the doctor, at the same time that he tells him the nature of his complaint, to tell his patient the best scientific methods of treatment for him to use.

What *are* the best methods? How are they carried out in the different countries?

In this address I am only dealing with the disease as it affects working

men and employés. I am leaving out of the question well-to-do patients, though these may gain some idea from it of the rules to be observed.

The remedies to be recommended vary according to the stage to which the disease has got, and also if the patient is single, married, or father of a family.

Three distinct periods may be defined. In the earliest the patient coughs and has a cold. What does he generally do? Either he takes no notice of it, or he asks the chemist for a mixture for his cough. Days, weeks, and months go by, and if the weather is inclement he gets worse; if it is mild, he has periods of being better, followed by more serious attacks. Then fever and wasting set in, and he has to give up his work. He thinks illness has just begun. We know that he is entering the second stage, when even skilled treatment is probably useless.

The first stage of the disease, therefore, interests us most, when intervention is of use.

In what way can we be of use to a patient in the first stage?

In Germany there are polyclinics for tuberculosis in the large towns, where a doctor, provided with the things necessary, attends to the patients who come to consult him, either throughout their illness, or till the patient can be admitted into a sanatorium.

A committee, composed of benevolent men and women in large numbers, looks after the patient at home, tells his wife what to do, sees that his home is kept clean, and looks after necessary prophylactic measures.

As far as possible, the misery consequent on the bread-winner being out of work is relieved from a bank, kept up like the sanatoria banks to assist such cases.

Mons. Calmette conceived the same idea, but he went farther, and advised that, instead of waiting for the workman to come for advice, they should go and meet him by inviting him to come to a dispensary run on the same lines as the German polyclinics.

This is his own description of his project that he gave in 1899:—

"Instead of waiting till the patient with tuberculosis comes to consult a doctor, and is driven to give up his work, I think that it would be better to establish the principle of going to him and offering him help before he finds out even that he is dangerously ill. I should like to be able to hunt out tuberculosis as soon as ever it has begun, and to be able then and there to give the sufferer advice and the care necessary, while generally keeping him in his own family circle."

Mons. Calmette has carried out his proposal; he opened an anti-tubercular dispensary at Lille, called Emile Roux, and it has been eminently successful.

Dr. Bonnet has founded a similar institution in Paris, in the Montmartre quarter; and others are about to be established, one at Vaugirard, with municipal aid.

Experience shows that workmen do not shun these dispensaries; some come because they have a cough, others because they know themselves attacked.

As far as I can see, the best way to ferret out disease would be to have

one or more agent-workmen, foremen-workmen, if it were possible. They are the ones to notice when their comrades cough; they could advise them to go to the dispensary. Alive to the dangers of a badly-kept workshop or yard, they superintend its being kept clean and in order; they actually carry out anti-tuberculous education.

Those who visit the dispensary receive the necessary attention from the doctors, and are told the danger of dissemination by sputum, alcoholism, etc. They are looked after, they get meat gravy—one or two meals, as far as funds will allow. Their families are helped and their home is kept an eye on from the hygienic point of view; as far as possible, the misery by which the poor man is threatened is kept away from him.

Among these patients some are found who must be sent to a sanatorium.

If the patient is an unmarried man, and if he can be sent to a sanatorium, his chances of recovery are very great; but for a married man to go means that his wife and family must be provided for during his absence and his mind relieved of all anxiety on their account.

Relief banks for assisting the families of the inmates are most necessary to sanatoria. And in many cases sanatoria are essential to complete the work begun at the dispensary.

It is not my business to deal with the question of building and management of a sanatorium.

We need only remember that they should be closed, aseptic, disciplined, and worked on Dettweiler's principle: physical and moral rest, stuffing, and open-air treatment.

In Germany this system has been carried out most enthusiastically through the assistance of private benevolence, municipal, industrial, and parochial aid; the State has generously supported the effort, recognising its value.

In Germany there are eighty-three public sanatoria open or ready to open. They accommodate twelve thousand patients a year. They have been built by local insurance, by sickness banks, by the manufacturers, who have combined to found sanatoria for their workpeople, by parishes which have united for the purpose. There are most of the latter. In some parts, a tax of from a penny a head has been exacted.

The State has founded several sanatoria for its servants: the forests department, railway department, and the State of Hamburg.

The Commission of the Budget of the Reichstag decided to build State sanatoria under the control of the Ministry of the Interior.

The treatment lasts at least 90 days, and experience has shown that it was good for the patients to spend another month, in the year following recovery, at the sanatorium.

Under these circumstances, how long do the patients keep better? Of those who leave the sanatorium in what is considered a satisfactory condition, it has been shown that 46 per cent. in 1896, 47 per cent. in 1897, 58 per cent. in 1898, 60 per cent. in 1899, were able to work in 1900.

The cost per head per patient for the three months' stay amounts to eight

francs per diem, including the cost of assistance given to the patient's family, which is a third of the amount.

In a very interesting report Dr. Pannwitz points out *desiderata* thought out by various medical men. Regret is expressed that nothing has been done for women and the middle class.[1]

Drs. Schroeder and Naumann Reiners justly point out that in patients of the middle class initial symptoms are more readily recognised, that they are more provident, and not so inclined to get overworked when they leave the sanatorium as the working class do, and thereby compromise their recovery.

Experience has shown, as Persiron says, the doctor is worth so much, the sanatorium is worth so much; and to provide doctors for sanatoria a special course of instruction will be established.

Dr. Pannwitz is very emphatic that if a sanatorium is to be well and economically managed it should be neither far from a town nor placed on a height; he expresses the wish that their erection were less costly, for it amounts to 10,000 marks per bed, and he thinks it should not exceed 4,000 marks.

Experience has, however, shown that a sanatorium is not a source of danger to a neighbourhood. What *is* dangerous is phthisis at large, which disseminates sputum everywhere—the house where patients are received without being controlled. Surveillance is quite indispensable.

Dr. Pannwitz mentions two villages in the Hartz Mountains which were decimated by these dangerous places. Lopo de Carvalho says the same about Guarda, in Portugal.

For the safety of all concerned, every house where tuberculous patients are taken ought to be open to State inspection.

Germany's example has been followed. England, Scotland, Australia, Canada have erected some few sanatoria.

In Austria, Schrötter had the Sanatorium d'Alland built, with 300 beds. Chevalier von Kusy turned into small sanatoria some huts of the Ducke type.

In the United States they set apart portions of hospitals to make consumptive wards of them. They made about thirty such small sanatoria. The Association of Alabama built one for prisoners, the Naval Department one for sailors. New York has actually six sanatoria.

By the munificence of the Czar, the Établissement Halila, in Russia, was built in 1897; and, since 1898, that of Tactzi, with two pavilions accommodating twenty beds for men and twenty beds for women. At Salta Princess Barjatinska has founded an establishment for schoolboys.

The King of Sweden gave the sum collected at his jubilee (2,300,000 crowns) to build three sanatoria; Parliament voted 800,000 crowns for the same object; and the State gave the ground required for these three sanatoria.

Denmark has already two sanatoria, and there is a scheme before Parliament for the erection of public sanatoria.

Italy and the Netherlands and Norway have followed suit.

In France several sanatoria have been opened: Hauteville, near Lyons; Angicourt, for Paris. Since 1876 we built the Home of Villepinte, and then that of Ormesson, for young tuberculous patients; and we may mention, in addition, the agricultural colonies of Cannet, the Jean Dollfus Home at Cannes, the Sanatorium of Gironde, that of Cimiez, near Nice, Argelez, and finally those which have recently been opened or will be: Lille, Nancy, Orléans, Versailles, Amiens, Le Havre, Marseille, and in Paris the Bligny and Rouen sanatoria, etc.

All nations have obeyed the same generous impulses, and the time will come when, instead of the poor tuberculous patient being given up to his sad lot, he will find, if he is only in the first stages of the disease, that by means of dispensaries and sanatoria there is always hope and often realisation of his recovery.

If the patient is beyond the first two stages when he asks for admission to the hospital, it must not be overlooked that he may still be cured, provided he can be made to see things as they are. He must be isolated, in order that he may not be discouraged by the spectacle of his comrades' sufferings.

Rules of isolation have been drawn up by Grancher and Thoinot for the patient, for his nurses; you have them in use in your own consumption hospitals. At Brompton, in twenty years, 15,000 consumptives have been cared for. No doctor or officer or nurse has been infected. This statement is supported by Dr. Williams, physician of the hospital, by Moeller, and by Masbrenier.

Gentlemen, when I was asked by the Committee to tell you in my address, which I am sorry I could not make shorter, what steps had been taken by the different nations to carry out the crusade against consumption, I was also asked to consider the question from the international point of view.

I do not think that it is possible to deal with consumption in this respect as plague, cholera, and yellow fever have been dealt with in order to prevent their being brought into a country. I do not know how any doctor can state positively that a traveller at the frontier or the port is not consumptive.

But it would be possible to take international steps in another way. Railway carriages might be disinfected, as well as steamboats and hotels, and the traveller no longer exposed to germs of contagion. That would be of truly international import.

The Minister of Public Works in France has recently sent a circular to railway companies calling their attention to the precautions necessary to obviate or diminish risk from tubercular contagion.

In several countries, particularly in the United States, hotel-keepers who receive a consumptive client have to notify it to the municipal authorities, and compulsory disinfection of the room has to be gone through.

The Minister of the Interior in Germany has brought in even more stringent measures.

Every doctor who attends a case of pulmonary or laryngeal tuberculosis is bound to report it in writing to the police as soon as he has made his diagnosis.

After death from tuberculosis the room in which the patient has died has to be disinfected as well as his belongings.

Hotel proprietors, "furnished house" keepers, asylums and other public institutions are compelled to notify at once every case of tuberculous disease which arises in their establishments.

Notification, disinfection, salubrity of hotels, carriages and steamboats are questions of an international character which might be advantageously dealt with by representatives of the different nations.

The lesson to be drawn from the efforts that have been made by all nations to carry out a crusade against tuberculosis is that in conversation, in the public prints, and in specially prepared pamphlets, we should make it universally known that tubercular contamination can be avoided, and that in addition the disease can be cured.

Once convince our fellow-citizens on these two points, and private initiative will be left behind; anti-tubercular efforts, numerous now, will multiply and co-ordinate; parishes, provinces, and the State will not be able to stand aloof from a common effort, and we may reasonably prophesy that, united in one brave attempt, the whole civilised world will succeed in exterminating the cruellest scourge that has ever fallen on us, our children and our friends, and which threatens the future of our countries.

Gentlemen, ten years ago, at the Congress of Hygiene in London, I spoke as follows:—

"The whole of humanity may rejoice, when, at the beginning of a century the name of Jenner can be inscribed, and at its close Pasteur's; against misery, sickness, and death more has been done than in any preceding century."

All honour to the nineteenth century, but the century just begun in its first year sees the greatest effort that has ever been made in favour of public medicine. May no obstacle stand in our way, and may those who succeed us, at the end of the twentieth century, be able to bear witness that our conviction has not been fruitless, and that the results have answered the expectations of the nations that you, gentlemen of the Organising Committee, have brought together with the highest and noblest motive that has ever animated the human race.

The CHAIRMAN, at the conclusion of Professor Brouardel's address, said: Ladies and Gentlemen,—All of us, I am sure, have heard with pleasure the able and interesting address which has just been delivered to us by M. Brouardel. I think myself it is a happy augury that this century upon which we have just embarked, in the eloquent words in which he referred to it, should be marked by this great effort of this great Congress in the interests of the welfare of mankind. I think it can scarcely fail to be a matter of the deepest satisfaction to us all that the greatest authorities on this question, who have already addressed the members of this Congress, are entirely agreed as to the main causes of the evil which this Congress has assembled here at the present to learn better how to fight, and as to the chief and the principal

remedies which it may be desirable to attempt. Both of them point to the many present unhealthy dwellings of the poor as one of the chief sources of the evil. That, gentlemen, is a question which I am sure comes home to every one of us in London, and not only in London, but in other parts of the United Kingdom where the same cause of evil prevails. It is a subject, I confess, which I have greatly at heart myself, and into which it has been my privilege from time to time carefully to inquire. (Cheers.) I learned with the greatest satisfaction that under the Act of Parliament which was passed only last year, and which did not meet, if I remember right, with much commendation at the time, that one of the largest provisions for this purpose that has ever yet been undertaken by any public body with the intention of providing more healthy dwellings for the poor has already been undertaken, and that progress is being made in that respect already. In other directions also, by private enterprise, such as that which has been so successfully carried out by Lord Rowton in the provision of houses—(cheers)—and with the knowledge also of the keen and zealous interest which has for many years been taken, and is being taken at this moment also, by his Majesty the King in this subject—(cheers)—we have every reason to hope and to expect that we may anticipate a greatly improved position of affairs in regard to this question in the no distant future. Again, gentlemen, M. Brouardel points out the great danger of the sputum of the human race, containing, as he says it does, thousands of contagious germs, which have to be guarded against, and which must be guarded against, if this great evil is to be overcome. And his neighbour on the right, the other great authority to whom I took the liberty of referring both on the question of the housing of the poor and also on the question to which I referred just now, is in entire and complete accord with him, for he described it as one of the most deadly sources of danger at the present time from this malady. Both of them are also agreed upon one of the great curative proposals which are suggested for combating this evil. Both of them attach enormous importance to the provision of sanatoria. Something has been done in this direction already, both in this country and in other countries of the world, and I think we may justly and properly look forward to the time when more accommodation will be provided, and when we shall have greater numbers of sanatoria for this purpose in all the countries that require them. It was reassuring to hear in what fell from M. Brouardel at this moment that one of the difficulties that many people might have thought would have stood in the way of that provision is not a difficulty we have to contend with, because I understood him to say it was not necessary that these sanatoria should be erected upon very great heights or in mountainous districts of the country. (Cheers.) The same distinguished authority has also given us his views on certain international precautions which might be taken. He points to the necessity of the disinfection of railway carriages conveying passengers from one country to another, of hotels, and various matters of that kind. With those few words, gentlemen, I think I might have closed my observations to you this afternoon, but it so happens that during the course of my career it has

been my duty, as the head of two great Departments in the State—the Board of Agriculture and the Local Government Board—both of which are deeply interested in this question, the one for the animals, the other for the human race—it has been my duty to give some attention to this subject, and I should like very briefly indeed, with your permission, to say one or two words upon another aspect of the question. (Cheers.) It seems to me that the able statements which were made to the members of this Congress yesterday, by one of those two great authorities to whom I have referred, will remain perhaps the most remarkable and possibly, therefore, the most unexpected incident of this Congress, for hitherto the opposite of his views has been the accepted doctrine. Since 1890 two Royal Commissions have examined in this country into all the bearings of this question, and one of those Royal Commissions it was my duty to appoint myself. Now, the first of these Commissions laid it down that this disease was not only transmissible between the animals, but from man to the animals as well; and in the absence of direct experiment on human beings, they also drew the inference—for I have had the curiosity to refer this morning to the report—that it was transmissible from food animals to man as well; in fact, that as regards the bovine animal and man the disease was transmissible all round. That has been the commonly accepted and, as far as I know, undisputed and undoubted doctrine down till the present time. Now, however, as all the world of course at present knows, in some quarters it is maintained that human tuberculosis is not transmissible to cattle; and on that point the doctrine seems to me, as far as I have been able to judge from the published accounts of these proceedings, to be not altogether without support. If that be so, then one-half of the hitherto accepted doctrine would appear to be still in a position of some doubt. Upon the other half, namely, that bovine tuberculosis is transmissible to man through the flesh and through the milk of cattle—indeed, upon the whole of the subject—I should say it would appear to be deserving of more consideration even than it has received at present. (Cheers.) But in the presence of such great authorities as are assembled in this country at the present time, it would be the height of presumption on my part to express any positive opinion upon the subject. In any case, I venture to say that the moral we should draw is this. All of us who are interested in this subject ought to be most careful before taking measures which might be injurious and hurtful to other interests in our zeal for the extinction of tuberculosis. I may, perhaps, ladies and gentlemen, be permitted to say this, that if the doubts which have been raised upon this subject are right, they would perhaps to some extent supply the answer to a question which I often put in days gone by to one of my colleagues on the Local Government Board, namely, my deeply lamented friend, the late Sir Richard Thorne-Thorne—(cheers)—than whom no Minister in the world ever had a more able, a more enthusiastic, or more charming coadjutor. "How is it, my dear Thorne," I used to say to him, "that if all these dreadful things that we are told about the transmission of tuberculous disease by the flesh and by the milk of cattle are true, any of us are left alive?"

(Laughter.) An enormous number of the cattle of this country—and that is a subject upon which I am able to speak with some assurance, and especially of the best and highest breeds—are notoriously affected with tuberculosis. (Hear, hear.) Why are we not all of us dead long ago? (Laughter.) Perhaps a further examination of this question in the light which has been recently thrown upon it by the statement I have referred to, might throw some more light even still upon this question.

But, gentlemen, be that as it may, this is essentially a subject for the discussion and the deep consideration of the great Congress which is met and which is assembled in London at this moment for the purpose. That consideration I am certain they will give it, and I think we can have little doubt that in the conclusion they ultimately arrive at they will be right. I will say to you this afternoon no more than this: Those members of the Congress who have come to England from abroad have already received the hearty and unanimous welcome of this country—(cheers)—and most sincerely also I am sure every one of us will hope they may prosper greatly in the great effort they are making for the welfare of mankind, and that the day may not be distant when the sittings of this Congress in London will become memorable for the good work they have done.

Now, gentlemen, let me conclude these few words to you by the performance of a most simple duty, that of asking you to pass a unanimous vote of thanks to M. Brouardel for the address to which we have listened with such great satisfaction this afternoon. (Cheers.)

Professor Dr. GERHARDT, rising also to support this vote, said, in German: Honoured Assembly,—I, also, should like, with the permission of your honoured President, and I might indeed say in answer to a sign from him, to offer a few words of thanks, I believe on the part of all here, to the honoured speaker.

Our honoured investigator, and to-day I can well say our teacher, has in the most splendid manner from his own experience taught us and enlightened us about what this Congress above all should learn and should bring to general knowledge, the causes of the disease. He has pictured to us the cause of the disease so far as springs from man and animals, and has especially thought out the most important favouring conditions which aggravate and which co-operate with it, namely, the dwelling, the air which we breathe, our mode of life, and the abuse of alcohol; he has depicted to us the danger of these favouring causes, and warned us from them, and explained how they are to be avoided, how they are to be combated. He has then further pictured, and, I may say, justly apportioned, the zeal of the individual nations who have taken part in the noble struggle of the world in the fight against tuberculosis, and certainly in his speech he has with justice given the palm to England. (Applause.) Great Britain enjoys the smallest death-rate by reason of the strict habits of life of its inhabitants, which we admire, and by its legislation, which has been described to us. Great Britain has in the course of years effected a number of improvements in dwellings and general

sanitation, which, as we have heard, have reduced the death-rate from tuberculosis forty per cent. He has then reminded us, and certainly with justice, that the infectivity of tuberculosis, so long doubted by the learned and never believed by the people, exists, and was, moreover, first demonstrated by the experiments of his renowned countryman, Pasteur, so that no one can ever doubt it henceforth. (Cheers.) He has besides all this considered, again with great exactness, what is now happening in France, and he has also done justice to Germany. He has acknowledged how in the quiet work of our laboratories the causes of the illness were first brought to light. He has touched upon the sanatorium movement which is now going forward in such a powerful way in our country, as well as in many others, for which mention we are very grateful. He gave us then, first, an abstract of what the disease causes, and then of what has to be done, and impressed most strongly upon us that every nation must follow the other, must fight together in a brotherly way against this dangerous internal enemy.

That which he has told us will certainly help to ensure the success of this Congress, and in this respect, also, we can again offer him our thanks, although it has already been done in the eloquent words of the gentleman sitting before me. What he has said will certainly help this third Congress, held on such favourable shores, in a country with such well-developed sanitary arrangements and hygienic habits of life, to raise these still higher, and it will bring good to the whole world if we lay what he has said to heart and spread it abroad. (Loud applause.)

The vote of thanks to Professor Brouardel was then carried by repeated acclamation, after which the meeting closed.

FOURTH GENERAL MEETING.

The FOURTH GENERAL MEETING was held in the QUEEN'S HALL at 3 P.M. on Thursday, JULY 25th, EARL SPENCER, K.G., occupying the CHAIR.

The CHAIRMAN, rising to open the meeting, said: I hope you will excuse me making some personal allusion to myself at the opening of this important meeting, but I wish to say that I am obliged, before very long, to go to another place, where I have some important business and some motions to make—I mean to the House of Lords. I hope, therefore, you will allow me to make but a very few remarks at the opening rather than at the close of the discussion. I feel it, I can assure you, a very great honour at having been asked to preside at one of the general meetings of this great Congress, for I attach enormous importance to what the Congress has in view and the great work which it proposes to carry out. I have had a good deal to do in my life with certain phases of disease, not with human disease, but rather with that of animals; and I therefore, probably on that account, was selected to preside here to-day, when my friend Professor McFadyean, who holds such a distinguished place in veterinary science in England—(cheers)—is about to deliver an address on a very important subject--milk and tuberculosis. Now I must venture very shortly, and in a very few words, to refer to this subject. We laymen, of course, cannot pretend to give an opinion on the scientific aspect of this great question, but we have, I think, an important part to play towards men of science who bring forward their proposal to exterminate this disease, or, at all events, to find a cure for it; and they must, in my opinion, if they are to be successful, have the support of a popular vote in this country. (Cheers.) We politicians and we agriculturists have a good deal to say to that, and I am quite sure that we shall all do our utmost to support the views and the recommendations which this Congress may make at the instance of the very distinguished men of science who have been discussing various points with regard to consumption at this Congress. Now, a right honourable friend of mine was here yesterday—I do not know whether he was in this room or in another place—Mr. Chaplin, who has held two high offices in this country connected with diseases, one as President of the Local Government Board, where the health of all of us has to be looked after, and also as President of the Board of Agriculture, where the health and sanitary condition of animals has to be looked after. To a great extent I sympathise with what he has said on this subject. He referred to a very important and most interesting paper, interesting not only to men of science, but to anybody who takes any interest in this great subject. This subject was made clear on Tuesday last by that very eminent man, Professor Koch. He propounded his views at great length

and with great ability to the Congress, and those views are somewhat different from the views which we have hitherto learned in this country. If those views prevail—those views with regard to the transmission of tuberculosis from human beings to animals and from animals to human beings—those views, if they prove to be correct, must be of enormous importance in this country. They will relieve the agricultural world of an enormous responsibility, but, when I say that, I wish to warn all those, having been educated in rather a contrary doctrine, to do their utmost to promote what they believe would be one of the preventives of the spread of this disease in this country, viz., to encourage the protection of those who drink milk. Now that I have always believed, and I still do believe, to be of the utmost importance—(cheers)—and I should be very sorry if any words that have fallen from this distinguished man should stop and arrest the progress we have been making lately in trying to persuade farmers and dairymen to keep their byres and their sheds in a clean and proper condition, and also, moreover, to prevent their using, as I am afraid in the past they have—probably or, at least, I hope from ignorance —cows which have this terrible disease of tuberculosis. I hope we shall press this Congress forward for further investigation in this matter. (Hear, hear.) The distinguished professor, in what he said, did not lay it down as a perfect certainty that tuberculosis of animals could not be communicated to human beings. I took down his words. He said that he felt justified in maintaining that human tuberculosis differed from bovine and could not be transmitted to cattle. That is what he proved; but with regard to the rest he said that though he did not believe bovine tuberculosis could be communicated to human beings, he left that in considerable uncertainty. It seemed to him very desirable that these experiments should be repeated elsewhere, in order that all doubt as to the correctness of his assertion might be removed. I support that, and I trust that further investigation will be made. I hope this Congress and all those interested in this great subject may be assured that the agricultural world—and perhaps I ought to add the political world—will support all those measures which are calculated to prevent the spreading of this dire scourge to the human race, and will neglect no precaution to carry this out. (Hear, hear.) I sincerely trust that the words he used, which no doubt will remove, as I said before, some feeling of responsibility in the agricultural world, will not prevent those precautions which have been fast gaining ground in the country, because, whatever may be said on this subject, I cannot help thinking that milk from diseased cows, whatever the disease may be, whether it is the same as consumption or not, must be injurious to the health of the whole population, not only the adults, but chiefly the children of this country. (Applause.) I shall not say any more. I shall only introduce my friend Professor McFadyean, and I would add that some very distinguished speakers will follow him. There will be Professor Nocard, Professor Bang, Professor Hamilton, Dr. Ravenal, Professor Crookshank, and Professor Sims Woodhead. I am quite sure that their remarks will be listened to with the very greatest respect, and I can only conclude by most heartily and sincerely wishing success to this Congress which is now assembled in London. (Loud applause.)

Professor JOHN MCFADYEAN then read the following paper:—"Tubercle Bacilli in Cows' Milk as a Possible Source of Tuberculous Disease in Man."

As recently as a few days ago, when I was mentally arranging the material for the paper which I have now the great honour of submitting to this Congress, I was under the impression that it would not be necessary to formally prove that the term tuberculosis as it is now employed by medical men and veterinary surgeons relates to one and the same disease. I thought that I might ask my audience to accept it as proved and generally admitted that tuberculosis in man is caused by a single definite species of organism, the tubercle bacillus; that this organism is also the cause of the disease to which veterinary surgeons apply the term tuberculosis in the case of cattle and other domesticated species, and that there therefore existed a *primâ facie* case against the germs formed in the bodies of tuberculous animals as a possible source of tuberculous disease in human beings.

To-day, however, the position of anyone who undertakes to discuss the inter-communicability of human and bovine tuberculosis is very different from what it would have been a week ago, for in the interval the greatest living authority on tuberculosis—the world-renowned discoverer of the tubercle bacillus, and the man to whom we are mainly indebted for our knowledge of the cause of tuberculosis—has declared his conviction that human and bovine tuberculosis are practically two distinct diseases. I do not know how far the reasons assigned by Dr. Koch for the opinion which he now holds on this question may have commended themselves to the members of this Congress, and I am overwhelmed at finding myself in a position which compels me to offer some criticism on the pronouncement of one the latchet of whose shoes I am not worthy to unloose.

That bovine and human tuberculosis are identical diseases was generally supposed to have been finally determined by Dr. Koch himself, when he discovered that the human and the bovine lesions contained bacilli that were identical in morphological, tinctorial, and cultural characters, and showed that the artificial cultures from both sources produced indistinguishable effects when they were employed to infect a variety of animals. The labours of hundreds of workers during the succeeding eighteen years produced nothing in serious conflict with the conclusion that human and bovine tuberculosis were identical diseases, but they brought to light what appeared to be additional evidence of this identity, such as the discovery that tuberculin produced a specific reaction in tuberculous cattle, whether human or bovine bacilli had been employed in its preparation. In short, the identity of the bacilli from the two sources appeared to be as firmly established as any other generally accepted opinion regarding the identity or non-identity of bacteria associated with disease in more than one species of animal. Since it thus appeared to be proved that the only difference between human and bovine tubercle bacilli lay in their accidentally different position—one being parasitic in man and the other in cattle—it was natural to conclude that, when circumstances were favourable for the transference of bacilli from one species to the other, human tuberculosis might have an animal origin, and *vice versâ*.

Opinions varied as to the frequency with which this transmission of tuberculosis from one species to the other occurred, but practically never within the last eighteen years regarding the possibility and probability of such reciprocal infection. What are the grounds upon which we are asked to discard convictions that appeared to rest on such a solid basis? I shall endeavour to state them briefly, as I understand Dr. Koch's train of reasoning.

(1) The bacilli found in cases of bovine tuberculosis are much more virulent for cattle and other domestic quadrupeds than the bacilli found in cases of human tuberculosis.

(2) This difference is so marked and so constant that it may be relied upon as a means of distinguishing the bacilli of bovine tuberculosis from those of the human disease, even assuming that the former may occasionally be found as a cause of disease in man.

(3) If bovine bacilli are capable of causing disease in man, there are abundant opportunities for the transference of the bacilli from the one species to the other, and cases of primary intestinal tuberculosis from the consumption of tuberculous milk ought to be of common occurrence. But post-mortem examination of human beings proves that cases of primary intestinal tuberculosis are extremely rare in man, and therefore it must be concluded that the human subject is immune against infection with the bovine bacilli, or is so slightly susceptible that it is not necessary to take any steps to counteract the risk of infection in this way.

Now, with the utmost diffidence, I venture to submit that at least one of the premises contained in this argument is not well founded, that the others have little or no bearing on the question, and that there still remain reasonable grounds for regarding tuberculous cows' milk as distinctly dangerous to human beings.

It cannot be denied that what may be called bovine tubercle bacilli are as a rule distinctly more virulent for cattle and other domesticated animals than human bacilli, or that the results of experiments indicate that in natural circumstances there is little danger of cattle becoming infected from human beings. But it cannot be admitted that the low virulence of human bacilli for cattle proves, or even makes it probable, that bovine bacilli have only a feeble pathogenic power for man. That might have been held to be probable if it had been shown that bovine bacilli were very virulent only for cattle, but since it is well established that these bacilli are highly dangerous for such diverse species as the rabbit, horse, dog, pig, and sheep, and, in short, for almost every quadruped on which they have been tried, it appears to be highly probable that they are also dangerous to man. At any rate it is impossible to cite any ascertained fact relating to other bacterial diseases that makes the contrary conclusion probable. It is well known that the majority of disease-exciting bacteria are harmful to only one or two species, but all those that are common to all the domesticated animals are also pathogenic to man

With regard to the view that the difference between human and bovine bacilli in respect of virulence for cattle is of such a fixed and constant character that it may be relied upon to distinguish the one from the other, it need only be said that that is very far from proved. It appears to be quite possible that what may be called the normal or average virulence of bovine bacilli for cattle may be reduced by passage through the human subject. Besides, there are very great differences in the virulence of tubercle bacilli found in animals of the same species, and if a low degree of virulence for cattle is to be taken as the distinguishing feature of human bacilli, there will be no difficulty in proving that the human disease is sometimes transmitted to the lower animals.

The third proposition in Dr. Koch's argument is the only one which is really germane to the point at issue, viz., that only cases of primary intestinal tuberculosis can possibly have had their origin in infected milk or meat, and that "such cases are extremely rare." Dr. Koch refers to several large series of post-mortem observations that appear to justify this statement, and adds that he could have cited many more pointing to the same conclusion. Now, if it were a fact that all the statistics relating to this point were unanimous, it would have to be admitted that primary intestinal tuberculosis is rare in the human subject, and that cases of infection through milk are still rarer, though even then it might be advisable to take measures to prevent the few cases. But the statistics are not by any means unanimous, and those that are likely to appeal with most force to the people in this country are not at all in accord with those quoted from Germany. During the last few years the evidence obtainable from the post-mortem records of two of the largest hospitals for children in this country have been analysed with great care, in order to see what evidence they afforded as to the relative frequency of the different methods of infection in tuberculosis. In the case of the Hospital for Sick Children in Great Ormond Street, this has been done by Dr. George Still, and in the case of the Royal Hospital for Sick Children in Edinburgh by Dr. Shennan. The conclusion at which Dr. Still arrived was that in 29·1 per cent. of the cases of tuberculosis in children primary infection appeared to have taken place through the intestine. That is very far from being an insignificant proportion, and it is a striking fact that Dr. Shennan arrived at an almost identical conclusion, and estimated that 28·1 per cent. of the cases of tuberculosis among children in Edinburgh are due to alimentary infection. There does not appear to be any ground for supposing that there is a large margin of error in these statistics, as the number of cases dealt with was considerable (547 in the two series), and in both series the post-mortem appearances were interpreted in a way to which no exception can be taken. In face of these statistics it is not possible to assent to the statement that cases of primary tuberculosis of the alimentary canal are extremely rare. Precisely the contrary conclusion is the one that must in the meanwhile be drawn with regard to the state of affairs in this country, viz., that, at least in children, primary infection by way of the alimentary canal is comparatively common.

I therefore submit that there is still a strong *primâ facie* case against

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(2) This difference is so marked and so constant that it may be relied upon as a means of distinguishing the bacilli of bovine tuberculosis from those of the human disease, even assuming that the former may occasionally be found as a cause of disease in man.

(3) If bovine bacilli are capable of causing disease in man, there are abundant opportunities for the transference of the bacilli from the one species to the other, and cases of primary intestinal tuberculosis from the consumption of tuberculous milk ought to be of common occurrence. But post-mortem examination of human beings proves that cases of primary intestinal tuberculosis are extremely rare in man, and therefore it must be concluded that the human subject is immune against infection with the bovine bacilli, or is so slightly susceptible that it is not necessary to take any steps to counteract the risk of infection in this way.

Now, with the utmost diffidence, I venture to submit that at least one of the premises contained in this argument is not well founded, that the others have little or no bearing on the question, and that there still remain reasonable grounds for regarding tuberculous cows' milk as distinctly dangerous to human beings.

It cannot be denied that what may be called bovine tubercle bacilli are as a rule distinctly more virulent for cattle and other domesticated animals than human bacilli, or that the results of experiments indicate that in natural circumstances there is little danger of cattle becoming infected from human beings. But it cannot be admitted that the low virulence of human bacilli for cattle proves, or even makes it probable, that bovine bacilli have only a feeble pathogenic power for man. That might have been held to be probable if it had been shown that bovine bacilli were very virulent only for cattle, but since it is well established that these bacilli are highly dangerous for such diverse species as the rabbit, horse, dog, pig, and sheep, and, in short, for almost every quadruped on which they have been tried, it appears to be highly probable that they are also dangerous to man. At any rate it is impossible to cite any ascertained fact relating to other bacterial diseases that makes the contrary conclusion probable. It is well known that the majority of disease-exciting bacteria are harmful to only one or two species, but all those that are common to all the domesticated animals are also pathogenic to man

With regard to the view that the difference between human and bovine bacilli in respect of virulence for cattle is of such a fixed and constant character that it may be relied upon to distinguish the one from the other, it need only be said that that is very far from proved. It appears to be quite possible that what may be called the normal or average virulence of bovine bacilli for cattle may be reduced by passage through the human subject. Besides, there are very great differences in the virulence of tubercle bacilli found in animals of the same species, and if a low degree of virulence for cattle is to be taken as the distinguishing feature of human bacilli, there will be no difficulty in proving that the human disease is sometimes transmitted to the lower animals.

The third proposition in Dr. Koch's argument is the only one which is really germane to the point at issue, viz., that only cases of primary intestinal tuberculosis can possibly have had their origin in infected milk or meat, and that "such cases are extremely rare." Dr. Koch refers to several large series of post-mortem observations that appear to justify this statement, and adds that he could have cited many more pointing to the same conclusion. Now, if it were a fact that all the statistics relating to this point were unanimous, it would have to be admitted that primary intestinal tuberculosis is rare in the human subject, and that cases of infection through milk are still rarer, though even then it might be advisable to take measures to prevent the few cases. But the statistics are not by any means unanimous, and those that are likely to appeal with most force to the people in this country are not at all in accord with those quoted from Germany. During the last few years the evidence obtainable from the post-mortem records of two of the largest hospitals for children in this country have been analysed with great care, in order to see what evidence they afforded as to the relative frequency of the different methods of infection in tuberculosis. In the case of the Hospital for Sick Children in Great Ormond Street, this has been done by Dr. George Still, and in the case of the Royal Hospital for Sick Children in Edinburgh by Dr. Shennan. The conclusion at which Dr. Still arrived was that in 29·1 per cent. of the cases of tuberculosis in children primary infection appeared to have taken place through the intestine. That is very far from being an insignificant proportion, and it is a striking fact that Dr. Shennan arrived at an almost identical conclusion, and estimated that 28·1 per cent. of the cases of tuberculosis among children in Edinburgh are due to alimentary infection. There does not appear to be any ground for supposing that there is a large margin of error in these statistics, as the number of cases dealt with was considerable (547 in the two series), and in both series the post-mortem appearances were interpreted in a way to which no exception can be taken. In face of these statistics it is not possible to assent to the statement that cases of primary tuberculosis of the alimentary canal are extremely rare. Precisely the contrary conclusion is the one that must in the meanwhile be drawn with regard to the state of affairs in this country, viz., that, at least in children, primary infection by way of the alimentary canal is comparatively common.

I therefore submit that there is still a strong *primâ facie* case against

than that in Great Britain. My own experience leads me to think that about two per cent. of the cows in the milking herds in this country are thus affected. Now, the milk secreted by a tuberculous udder always contains tubercle bacilli, and it sometimes contains enormous numbers of them, and when these facts are apprehended one begins to realise the seriousness of the danger to which, in the present state of affairs, those who drink uncooked milk are exposed. But there are one or two considerations that make the danger greater than the mere statement of the number of cows affected would at first sight indicate. In the first place, the udder disease is not attended by any pain or tenderness in milking, and the milk, for a considerable time after the udder has become manifestly diseased, may appear quite wholesome, though in reality it is charged with the germs of tuberculosis. It therefore often happens that the gravity of the condition is not realised by the milker or the owner of the cow, and the milk continues to be sold for human consumption. There is scarcely any room for doubt that if it were sold and consumed unmixed with other milk, some of the persons partaking of it would become infected. In practice it is usually mixed with the milk from other cows that have healthy udders, and thus the germs are distributed among a larger number of persons. Even tuberculous milk that has been thus much diluted may prove infective, but the danger to the individual consumer is in inverse proportion to the degree of dilution.

Since about one cow in fifty is the subject of tuberculosis of the udder, and the average number of cows in the milking herds of this country is less than fifty, it follows that the majority of dairies and farms supply milk that is free from tubercle bacilli, or at least does not contain any derived from this source. On the other hand, when the infected material is present, it operates with the greatest intensity in the milk of single cows, and in the mixed milk from small herds.

It must be added that tuberculous disease of the udder is not the only source of tubercle bacilli found in milk. A great deal of the milk in the market contains a considerable quantity of dust and dirt, most of which comes from the cow's udder and the hands of the milker, and part from the dust of the air of the cowshed. When thirty per cent. of the cows in a byre are tuberculous, the dirt in that building, and the atmosphere in it, are almost certain to contain tubercle bacilli, and some of these are very likely to find their way into the milk. The more dirt milk contains, the greater is the chance that tubercle bacilli from that source may be present.

What has been said with regard to the extent of the danger to which the public are exposed through the sale of milk containing tubercle bacilli may be summed up as follows:—The danger cannot be defined by stating how many persons are thus infected annually, or what fraction the persons thus infected form of the total number who contract tuberculosis in the course of a year. At the same time, it is impossible to doubt that the danger is a very real one, since at the present time milk is a vehicle by which tubercle bacilli are often introduced into the bodies of human beings.

Means of Averting the Danger.

The ideal method of counteracting this source of human disease would be to stamp out bovine tuberculosis, or to prevent the sale of milk from every cow that is tuberculous. Unfortunately, it must be admitted that at present that is unattainable. At the present time probably not less than thirty per cent. of all the breeding and milking cattle in this country are in some degree affected with tuberculosis, and to urge that the disease should be attacked on the lines adopted in dealing with cattle plague and pleuro-pneumonia is an effectual method of preventing any Government from touching the subject. But, although the complete and rapid extermination of the disease is impossible, it does not follow that nothing can be done, or ought to be done, in the way of prevention. The disease has attained to its present alarming proportions simply because, until quite recently, altogether erroneous notions were held regarding its cause, and because there has hitherto been the most absolute neglect of the precautions necessary for its prevention. The greatest obstacle to successful action against tuberculosis, whether in man or animals, is the ignorance of the laity regarding the cause of the disease. The immense majority of cattle-owners are not yet convinced that contagion is the only cause of tuberculosis, and very few of them have yet made the slightest effort to check the spread of the disease. As a rule, cows and other cattle visibly ill from tuberculosis are still left alive and in close association with their fellows, although the lowest grade of common sense and prudence would suggest that such animals ought to be promptly killed, or at least isolated. It is not want of common sense, nor is it mainly lack of means, that is responsible for this inaction; it is simply a want of conviction on the part of cattle-owners that tuberculous animals are dangerous to their companions.

The first thing necessary in this connection is education of the people regarding the nature of the disease. It is necessary, because in this country, where Parliament never moves except by the force of public opinion, the legislative action required will not be taken unless the people are satisfied of its wisdom, and also because even the most drastic sanitary measures enforced by the law are likely to fail if they are not supplemented by the intelligent co-operation of the people. The National Association for the Prevention of Consumption and the Royal Agricultural Society have been endeavouring to disseminate sound views regarding the cause of bovine tuberculosis among farmers and others, but much remains to be done in this direction. But it is not reasonable to ask that things should be left as they are until the education of the farmer in the matter of tuberculosis has been finished. If there are any practicable and reasonable measures by which, figuratively speaking, the flow of tubercle bacilli from tuberculous cows to healthy human beings can be stopped or impeded, they ought to be immediately enforced.

As soon as the valuable diagnostic properties of tuberculin had been proved by experience, it occurred to a good many people that its assistance ought to be called in in order to exclude tuberculous cows from

milking herds. In other words, it was thought that although it might not be practicable to insist upon the application of the tuberculin test to all infected herds, and to compel the isolation or slaughter of all cattle thus found to be infected, it might still be possible to require that only cows found to be free from the disease by the application of the test should be kept for milch purposes. I doubt whether anyone who is well acquainted with the circumstances of the case now believes this practicable. Here, again, the fact that one-third of the cows now giving milk are tuberculous is an insurmountable obstacle. The cost of carrying out the tuberculin test several times annually in all the milking herds in this country would be enormous, and the exclusion of all reacting cows from such herds would seriously disorganise cattle breeding as well as milk production. Moreover, to rely blindly on the tuberculin test, and to pronounce the milk of every cow that does not react to it free from tubercle bacilli, would be very unsafe. The test is recognised to be one of great value, but it is not infallible. Rather serious defects in connection with it are (1) that for a period after infection—a period that is sometimes very considerable—an animal will not react; (2) that in some advanced cases of tuberculosis no distinct reaction is obtainable; and (3) that in a considerable proportion of cases a second reaction is not obtainable for some days or weeks after the first. It is therefore clear that if we wish to exclude the milk of tuberculous cows, or if the object is the more restricted one of preventing the sale of milk from tuberculous udders, some system of inspection is necessary. This was the conclusion at which the Second Royal Commission on Tuberculosis arrived. We have already seen that whatever danger attaches to milk comes mainly from the cows with tuberculosis of the udder, and the public health would be almost entirely safeguarded from this danger if we could exclude such animals from our dairies. Periodic examination by competent inspectors would go a long way to securing this object, but the inspection would require to be at rather short intervals, for tuberculosis of the udder may come into existence and attain most dangerous dimensions in a period of a few weeks. The more frequent the inspection the better, but, of course, this means a great deal of expense.

If every town and rural district produced its own milk, it would be a comparatively simple problem to organise and carry out a fairly efficient system of inspection of milch cows; but, as the law at present stands, the majority of the population cannot obtain this safeguard. With the exception of Glasgow, Manchester, and a few other places, a local authority has no power to inspect cows outside its own district, and the helpless position in which this state of the law leaves the inhabitants of London and other large towns is obvious. If cows of which the milk is sold for human food had everywhere to be submitted to periodic inspection, such inspection would naturally be undertaken by the various local authorities, each of which would supervise the cows and cowsheds in its own district; but the compulsory inspection of all the milch cows in the country would be a very large undertaking, and perhaps it would be premature to press for it. In the meantime, a good case can be made out for making general the special powers relating

to inspection of cows in outside districts which a few fortunate cities have acquired by special Acts of Parliament. This also was one of the directions in which the members of the Second Royal Commission on Tuberculosis considered immediate action to be necessary.

There remain for consideration some other safeguards which would doubtless be less effective than those just discussed, but which, unlike these, would not be difficult to enforce, viz :—(1) compulsory notification of udder disease and of any symptoms of tuberculosis in milch cows, with, of course, the power to inflict a considerable fine for not reporting ; and (2) the interdiction of the sale of milk from any cow suffering from tuberculous disease of the udder, or exhibiting clinical signs of tuberculosis. Against the demand for the amendment of the existing law to the extent of granting the public these very reasonable safeguards against infection through milk, it cannot be urged that they would be very expensive, or that they would press harshly on private interests. The present state of the law, or rather the almost entire absence of any law dealing with tuberculous udder disease in cows, is a scandal and a reproach to civilisation. It scarcely sounds credible, but it is a fact that the owner of a cow in the most advanced state of tuberculosis, and exhibiting the most manifest signs of udder disease, may sell that cow's milk for human food as long as the sale has not been specially interdicted on the certificate of a veterinary surgeon, and no penalty attaches to this crime of deliberately or carelessly placing on the market a food material charged with the germs of a dangerous disease.

In the interests of public health, the sale of milk from tuberculous udders, and from cows that are obviously tuberculous in any part of the body, must be stopped, and it must be declared illegal to keep such animals alive. There need be no hesitation in pressing for this reform, because the measures demanded are in the interests of the owners of cattle, and would be advisable even if it were established that bovine tuberculosis is not transmissible to man. There is no dispute as to the danger of visibly tuberculous animals to others of their own species, and it is the very reverse of a hardship to the owner of such animals to insist on their being slaughtered.

It would probably be regarded as a serious omission if I did not refer to one other method of counteracting whatever danger at present attaches to impure milk as a cause of human tuberculosis. No matter how highly charged milk may be with tubercle bacilli, it can be deprived of all danger from that source by raising it to the temperature known to be fatal to these germs. Less than the boiling temperature (212° F.) suffices for this purpose; but, unfortunately, the lowest temperature that can be relied upon imparts to the milk a flavour that many people find distasteful. That objection does not hold good in the case of infants and young children, and the custom of boiling or steaming the nursery milk for a few minutes cannot be made too general. But while abstinence from uncooked milk is a sure way of avoiding infection with bacilli present in that article of food, it cannot for a moment be admitted that this absolves public health authorities from all concern with the subject. Arsenical beer may be made harmless by adding the proper antidote

before drinking it, but the most courageous brewer would not plead this as an excuse for selling the impure article.

In conclusion I would venture to express the earnest hope that the Congress will not endorse the view that it is inadvisable to take any measures to prevent the transmission of tuberculosis from the lower animals to human beings. To justify the introduction of measures to that end it is not necessary to contend that this is a common method of infection, or that the danger arising from milk can for a moment be compared with that present in human sputum. The inhalation of tubercle bacilli expelled from the bodies of human patients is doubtless the great cause of human tuberculosis, and every practicable means of preventing infection in that way ought to be employed; but, at the same time, we ought not to concede to the milkmen the right to sell us tubercle bacilli, even if we were assured that—like Dr. Koch's experimental pigs—we had nothing to fear beyond the development of "little nodules here and there in the lymphatic glands" of our necks and "a few grey tubercles" in our lungs.

During the reading of Professor McFadyean's paper the chair was vacated by Earl Spencer and taken by Sir James Crichton-Browne.

After the applause which followed the conclusion of Professor McFadyean's address had subsided, the Chairman, Sir JAMES CRICHTON-BROWNE, said: Ladies and Gentlemen,—The attention with which you have followed Professor McFadyean's address satisfies me that you have appreciated its merits, and that you are prepared to join in a cordial vote of thanks to him. That address must, I think, have been written under circumstances of great difficulty, although it bears no trace of that, for it is able and interesting, and makes almost fascinating a somewhat grim and unæsthetical subject. It is characterised, I think, by scientific insight, by logical precision, and by caution and moderation of statement. (Hear, hear.) That address confirms, I think, if confirmation were necessary, the views expressed after the address of last Tuesday, that further investigation is necessary before those views can be accepted, and I think that Professor Koch will himself accept that view. His views are not only at variance with those generally adopted throughout this country, but they reflect upon the Report of the Royal Commission, and it therefore seems to me that it is the duty of the Government of this country to undertake the investigations which are now absolutely necessary. (Hear, hear.) I do trust there will be no hesitation or delay on the part of the Government in undertaking this important and vital duty. I would quote to you an instance of what I regard as just and proper promptitude in such a matter. We have with us Dr. Brown, who is the delegate and representative of Wisconsin. He thought it his duty on Tuesday afternoon to telegraph to his Government the views set forth by Dr. Koch, and he received yesterday a telegram in reply: "Cable received; question considered; experiments begin to-morrow." (Loud applause.) Now, ladies and gentlemen, I am afraid we cannot expect our Government to begin to-morrow—(laughter)—but I hope

there will be no protracted delay in carrying out these investigations. If the Government will undertake them they will not be without voluntary aid, for, as some of you know, Sir James Blyth has most liberally and with great public spirit intimated that he will place at the service of any Government commission, or any committee appointed by this Congress, unreservedly the whole of his model farm in Essex. (Cheers.) And I believe Mr. Harold Swithinbank is also prepared to dedicate his well-appointed and private laboratory and his farm to the same purposes. In the meantime, ladies and gentlemen, our practical policy is, I am sure, to run no risks, and to permit of no relaxation in those restrictions which we have secured with great pains and great trouble, to run no kind of danger whatever of imperilling the lives and the health of our children. (Cheers.) I beg leave to propose a cordial vote of thanks to Professor McFadyean for his admirable address, and I would call upon Dr. Nocard, who is the McFadyean of France, to second that Resolution.

M. NOCARD said: Mr. President, Ladies and Gentlemen,—It is hardly necessary for me to say or repeat that I am completely in accordance on all points with Mr. McFadyean.

Yes, I believe, nay, I am convinced, that bovine tuberculosis is a danger to man. (Applause.) It is especially a danger in milk. It is milk that Mr. McFadyean is considering specially to-day. It is on this subject that I wish to add something to what I said the day before yesterday.

In France we have a law which orders the destruction of cattle affected with tuberculosis visible from the exterior, and from tuberculosis accompanied by clinical symptoms and manifesting itself by lesions in the udder.

Mr. McFadyean has just told you truly that it is these cows with tuberculous udders which are far the most dangerous, and that if these cows were withdrawn the danger which remains would be slight, if not destroyed.

It seems that we in France should be armed against this danger; but it is not enough to have good laws, it is necessary to have the means of applying them. But we have not these means. The mayor must issue the order for the destruction of a tuberculous cow, and before he can give this order he must be sure that it has a tuberculous udder; but his only means of knowing this is the declaration of the owner as prescribed by the law.

But dairymen never report when their animals are ill, or if they do so, it is when they cease to give milk—when they are no longer profitable to the dairy —that is to say, just when they cease to become dangerous; in fact, the law that we have remains, one may say, a dead-letter; it does not fulfil anything that was expected from it. This is why last year, in the commission held by Government to inquire into the measures to be adopted to check human tuberculosis, we demanded that a periodical inspection of all milk for public consumption should be organised. That is one of the resolutions proposed by Mr. McFadyean. Therefore I most heartily support all his proposals; I applaud them, and hope the Congress will give him its sanction, which will give us a very great force to back us in our efforts to obtain public power in France, and especially a law to organise inspection of dairy-farms.

The slaughter of cows which have either pulmonary or abdominal tuberculosis sufficiently developed to be recognised by a clinical examination is a great need. But, you will say, sometimes cows' milk is virulent, although they have no lesions in the udders. That is so; tuberculous bacilli is sometimes found in milk from cows who have no lesions in the udder. But I call on my colleague, M. Bang, who is certainly our greatest veterinary authority on this subject, and he will bear me out when I say that this is an extremely rare case, and when it does occur it can only be proved by inoculating into the peritoneum of guinea-pigs the sediment of the centrifugations of a great quantity of this milk, that is to say, it only contains a very small number of bacilli compared with milk drawn from tuberculous udders; which is proved by the fact that if, instead of inoculating it into the peritoneum of guinea-pigs, they are given this milk to drink in as large quantities as you can, these guinea-pigs do not become tuberculous, although these animals are susceptible to tuberculosis.

I have experimented on them, making them swallow tuberculous products, but these must be abundant and rich in bacilli; for when they do not contain many bacilli infection through the digestive channels produces no result, whereas it succeeds at once if inoculated into the peritoneum or injected hypodermically.

That is why, though we now endeavour to do all that is necessary and possible in the present conditions of milk production, we should be able to absolutely guarantee public safety. If we could obtain the authority for the destruction of all cows with tuberculous udders, all cows which have outwardly visible signs of this disease, we should eliminate the cause of abdominal tuberculosis, still so frequent in very young children. This is why I wish to give all the support I can to Mr. McFadyean's resolutions, and beg the Congress to adopt them. (Loud applause.)

Dr. HAMILTON, of Aberdeen, also thanked Professor McFadyean by saying: Mr. Chairman, Ladies and Gentlemen, I am sure that you have all listened with very great pleasure, and with a great amount of instruction, to the most interesting paper which has been read to us by Professor McFadyean. Not only is the paper full of scientific interest, but, as Sir James Crichton-Browne just remarked, there has been added an element of fascination which has carried away even the most unconcerned lay-members of this audience. Then it is a very great pleasure to me, as an old teacher of Professor McFadyean, to say that he was one of the pupils that perhaps I was proudest of, many as they are here at the present time, who have come through my own hands. I must say I have followed Professor McFadyean's career with the very greatest interest from the time—now, I am sorry to say, many years ago—when he was my pupil, and when he received his first instruction in matters pathological. And it has been to me of very great interest to see how from one stage to another he has brought scientific method to bear upon the work of veterinary medicine. I think those members of the veterinary profession who are here assembled in this

Congress will confess that up to within a comparatively few years ago veterinary medicine and veterinary practice were founded in great part upon empiricism and a sort of rule-of-thumb methods. It has been reserved for one or two of the most eminent members of the profession to sweep this away, and to place veterinary medicine upon a proper and sure basis, that is to say, upon a proper scientific basis; and I always think that in our teaching of medical science from the purely human point of view we are acting in an extremely narrow fashion. I hope that I am yet to see the day when the teaching of veterinary medicine will not be dependent upon a few private enterprises in different parts of the country, but when it will be introduced into the country, when a disease will be studied much more from comparative pathology than has been the custom in late years. (Hear, hear.) I may just say this further, that in bringing about this remarkable change Professor McFadyean has stood head and shoulders higher than any other member of his great profession. I think that will be granted by the populace at large, and I have the very greatest pleasure, therefore, in supporting a hearty vote of thanks for the most interesting and instructive address to which we have just listened upon this most interesting subject. (Cheers.)

Dr. P. MAZYCK RAVENAL, Bacteriologist of the State Live Stock Sanitary Board of Pennsylvania, said: Mr. Chairman, Ladies and Gentlemen,—There is little left for me to say in regard to the most able and instructive address that Professor McFadyean has given us, except to voice, as far as I am able, for the distant country of the United States of America, our appreciation of what he has said and done for the veterinary profession. A statement has been frequently brought forward by Professor Koch that one or two positive results far outweigh a number of negative results. My being asked to second this vote of thanks to Professor McFadyean is due, I think, to what I may speak of as the good fortune of having observed myself three cases of the direct infection of man by the bacillus of bovine tuberculosis. (Applause.) Before that time two cases had been reported, one by Tsherning and one by Pfeifer, the latter to be found in the Proceedings of the First Congress on Tuberculosis held in Paris in 1888. The three cases observed by myself were in the persons of Dr. Leonard Pierson, State Veterinarian of Pennsylvania, Dr. Edwards, and in my laboratory assistant, Dr. Gilliland. The first two cases were directly from the cow. The third case was by a pure culture of the bovine tubercle bacillus, which we had isolated and inoculated into a goat. Dr. Gilliland infected himself from this goat, and from the nodule on his hand we recovered it in pure cultures again. I have that culture in my laboratory, and can exhibit to anybody who doubts its existence. This has been carefully compared with the original cultures, and it retains its vigilance. Bolinger long ago showed, and Chaffe later, that infection from any animal through the skin was the most difficult means of introducing the bacillus. Even in cattle, if we introduce large numbers of vigilant bacilli into superficial layers of the skin by a process allied to that of vaccination, no effect will be produced. It is the common experience of every

pathologist who has done much post-mortem work, that the cutaneous tubercle produced by inoculation with the human bacillus passes away without treatment and without doing much harm as a rule. In those five cases which I have cited, one death resulted, showing a virulence at least as great as that of the human bacillus by the same method of inoculation. To these I may add two other cases observed by Dr. M. B. Hartzell, of the Department of Skin Diseases of the University of Pennsylvania. Although in these two cases there is no absolute proof that the infecting germ was of bovine origin, yet the evidence is very strong. Both were in men employed by the Pennsylvanian Railroad, one of our large railways, and those men were in charge of the cattle cars, and had to clean and repair them. They both wounded their hands by the ends of broken timbers, which were presumably infected by the excreta of tuberculous cattle—and we have a great many tuberculous cows in America—and tuberculous lesions followed, one of the men getting well afterwards. The other man, who weighed 175 lbs., and was forty-four years of age, and of good person and family history, died in less than one year through the involvement of the lungs and the internal organs. In view of this we have in the State of Pennsylvania a law—ably carried out by our State Live Stock Sanitary Board, the executive officer of which is Dr. Pierson, the State Veterinarian—by which no cattle are now allowed to come into Pennsylvania without having been previously subjected to the tuberculin test and tagged by an official tag. (Applause.) I wish once more to express for the State of Pennsylvania—as far as I am commissioned to do so—our thanks to Professor McFadyean for the splendid way in which he has presented this entire subject. I have much pleasure in seconding the most hearty vote of thanks to Professor McFadyean. (Applause.)

Professor CROOKSHANK, of London, said: Mr. Chairman, Ladies and Gentlemen,—I will only add my tribute to the expressions of great satisfaction with the address which we have heard from Professor McFadyean, an address characterised by lucidity of expression and by moderation in its conclusions. It is an address which I venture to say every member of this Congress should read and read again, and study in connection with the important address which was delivered by Dr. Koch. It is an address which will enhance the great reputation which Professor McFadyean has already acquired, not only in the profession to which he belongs, but among the workers in science throughout the world. (Hear, hear.) I esteem it a great privilege to have been invited to make a few remarks upon this occasion, and I trust you will excuse me if for a moment I make a few personal allusions. I presume I have been asked to speak partly because of an experiment which I made, which was of a positive character, and therefore in opposition to the conclusions arrived at by Dr. Koch; and I think there may be another reason. We must remember that this Congress is not merely a gathering of scientific men. It is a gathering, not only of those who are engaged in scientific research, of representatives of the medical and veterinary professions, but of representatives of agriculture, of delegates from the various local governing bodies throughout

the country, and of representatives of the general public. I may be permitted to speak on this subject, and to claim your patient attention for a few moments, because I have not only been engaged for the past sixteen years in investigating the subject of tuberculosis, but, as a practical agriculturist, I am in deep sympathy with the position held by the farmer of the present day, and having served on a county council and an urban council I know exactly the point of view from which delegates from these local governing bodies look at this question. And lastly, as a magistrate, I am keenly alive to the difficulties and responsibilities which arise when we have to deal with prosecutions for the sale of meat which has been condemned as unfit for human consumption. I propose to restrict myself entirely to Dr. Koch's paper, which has been referred to in Professor McFadyean's most able address. Permit me to say that I think we ought to acknowledge that we are really indebted to Dr. Koch for the courage which he has shown in pronouncing heterodox opinions which were bound to call forth great opposition and much hostile criticism. (Hear, hear.) I can speak feelingly on this subject. I know how much courage is required, when you have arrived at a conviction, to make criticisms or suggestions which may not be in accordance with some of the accepted creeds of the present day. I have heard it remarked that Dr. Koch's paper ought not to have been published. Wiser counsels prevailed. Criticism is essential to progress—(hear, hear)—and the way to meet such criticism is to bring counter-criticism; and by free and open discussion we shall arrive at what we all wish to arrive at—the absolute truth. (Cheers.) This subject is one of such enormous importance that I shall not be saying anything disparaging to the work that has been done in other sections of the Congress if I add that I believe that Dr. Koch's expressions of opinion will have done more than anything else which has been done in any other section to promote the cause of truth. What has been the immediate outcome of the criticisms which he has made? A demand for a commission; and I sincerely hope the Board of Agriculture will promptly appoint a departmental commission to inquire into this question. (Hear, hear.) And, if in our pathological laboratories we are suffering from apathy or want of work, there would be no excuse for us now, because Dr. Koch has given enough work for all the pathological laboratories throughout the world, and has given a great stimulus to scientific research. (Hear, hear.) Further, I would venture to say that it will be a great encouragement to physicians to make still more careful clinical observations, and to differentiate, as far as possible, those cases which they believe to be attributable to infection from a bovine source. Now I wish to say a few words with regard to the positive experiment which has already been quoted in connection with this subject. In the year 1888 I was privileged to undertake some experiments for the Board of Agriculture and to publish a report upon this very subject. I wish to explain what I think is the interpretation to be placed upon this result. I happened to be dealing with the case of a cow suffering from generalised tuberculosis, a cow whose milk was mixed with the general supply of a small dairy and supplied to the public. This cow was riddled with tuberculosis. The lungs were almost a solid mass,

the intestines covered with huge ulcers, the mesenteric glands were enormously enlarged, and the udder was diseased. That is an instance which leads me to support most strongly the statement of Professor McFadyean that it is very disgraceful that such a thing should be possible. (Hear, hear.) The cow, however, was extremely useful for pathological experiments. These experiments were made when there was not so much interest taken in this subject. Feeding small experimental animals with the milk, and inoculating animals subcutaneously, produced the most virulent tuberculosis that I have ever seen, and therefore I formulated these conclusions for the Board of Agriculture: "(1) cows with tuberculous udder are to be found in dairies in this country; (2) the milk of these cows is, as a rule, mixed with the general supply; (3) the milk in cows with tuberculous udder contains tubercle bacilli; (4) rabbits inoculated with or fed upon milk containing tubercle bacilli contract tuberculosis; (5) direct evidence of transmission of tuberculosis by milk to man is wanting, but from the effect of such milk on lower animals it is reasonable to conclude in the present state of our knowledge that there may be danger in using the milk of cows with tuberculous udders, and therefore strict inspection of dairies should be enforced, and the boiling of milk before use will, as a rule, be a wise, if not an absolutely necessary precaution." I abide by every statement that was made in those recommendations, and they were still further strengthened by another experiment which I was allowed to make. I had occasion to be brought into contact with a very advanced case of phthisis. The sputum contained numerous bacilli, and I injected this exceedingly virulent sputum into the abdominal cavity of a perfectly healthy calf with normal temperature. I will not trouble you with full details; I will for the moment address myself to my scientific colleagues. If you refer to that report you will find the full particulars, and that after the death of the animal in forty-two days there was tubercular deposit at the seat of infection, and from this point there were hundreds of wart-like fleshy new growths produced, some quite regular in form, either spherical or button-shaped. There were smaller deposits on the under-surface of the liver, in the spleen and in the internal organs. That post-mortem was made under the critical eye of my friend Sir George Brown. I only mention these details because I have heard it said that possibly this positive result was not a positive result at all, but that we were dealing with a case of congenital tuberculosis. That idea may be absolutely dismissed. We certainly had not tuberculin to test whether the animal was suffering from tuberculosis; but the character of the lesions which were produced, extending and radiating in all directions from the point of inoculation, was absolutely conclusive. I want you now to follow me and to see how far this affects the conclusions that have been arrived at by Dr. Koch. I made a further experiment, inoculating a calf intravenously with tubercle bacilli, and there was no result. Now Dr. Koch has stated that he inoculated a series of animals, some with tuberculous sputum and some with bacilli, and with negative results. I venture to say that, taking all these experiments together, they entirely bear out the view which I hold upon this important question, and my view is this: I think that Dr. Koch, from hasty generalisation,

is quite wrong with regard to this question of the possible transmission of tuberculosis from man to cattle, and therefore any final conclusions based upon the experiments which he has made would be misleading. The view that I take of the matter is this, and it is borne out by these negative experiments of Koch, that we are not dealing with a totally distinct disease, but we are dealing with two varieties of the same disease derived from a common ancestor. It is with considerable difficulty that the disease of human tuberculosis can be ingrafted upon the bovine subject, and it is quite possible that the reverse is also true. This is quite in accordance with bacteriological teachings. The bacillus which has grown upon a human soil does not find that the bovine soil is congenial, and quite possibly the reverse is also the case. I think this is the answer that may be given to the question which is sometimes asked, If we are not only always inhaling sputum from the streets, but always drinking tubercular milk and very often eating tubercular meat, why do not we all die from tuberculosis? I think that is the answer—that the disease is with difficulty transferred from bovines to man. There was in the experiment which I have referred to concurrent pyæmia, and it is quite possible that, in addition to using virulent virus, this concurrent pyæmia acted as a predisposing cause to the development of what was really a galloping infection of the peritoneum. There is another answer which must be given to this question, Why do we not all die from tuberculosis? The answer is that there has been a tendency to look upon the tubercle bacilli as the only factor, and that is a very great mistake. There are many factors in the production of tuberculosis. We cannot possibly eliminate the question of hereditary vulnerability, the effects of pre-existing diseases, the effects of chills and colds, and the effects of alcoholism. A perfectly healthy individual can inhale and take the bacilli of tubercle with food with impunity; but that is no argument against endeavouring to diminish the possibility of this taking place. We need not trouble about those who are physiologically healthy, or at any rate we want to direct our attention to preventing the possibility of the tubercle bacillus obtaining access to those who are vulnerable. (Applause.) Herein, then, is the point on which I differ entirely from Professor Koch. Professor Koch has performed a certain number of experiments, and he says, as the result of those negative experiments, that no measures are necessary. I cannot agree with that statement. I venture to say that there is a risk; and I think his recommendation that no measures are necessary is a great blot in a very able address. Such a statement tends to paralyse the efforts which we are making to fortify the community against tubercular invasion. I agree so far with Professor Koch as to say that I think the danger from tubercular meat has been greatly exaggerated, and I maintain that from too great enthusiasm in connection with this subject there has been hardship and injustice inflicted. (Hear, hear.) There is always danger from what I may call panic legislation, and we should be very careful to be sure that legislation is not made in advance of well-ascertained facts. I have taught for years that there is no danger in consuming the flesh of animals suffering from a purely local tuberculosis; and I regard it almost as absurd and unjust to condemn

the carcass of a "prime fat" beast suffering from purely local tuberculosis as it would be to condemn the carcass of an animal suffering from an actinomycotic wen or from actinomycosis of the tongue. But when we come to the question of generalised tuberculosis, and when in dairies we know that there are animals suffering from tuberculous udders, I insist upon it that there may be danger. The whole position of this question is dominated by that little word "may," and the evidence which has accumulated might even justify us in putting it still stronger. Even Dr. Koch—and that is the point I fail to understand—in his remarks admits, if you carefully read his paper, that there is some risk; and I cannot therefore understand the attitude of mind which would proceed to advise that no preventive measures are necessary. I would rather adopt the attitude of mind of Dr. Butler, the author of Butler's "Analogy." I hope I shall not be wounding the religious susceptibility of anybody present if I refer to a remark which Dr. Butler made. He said, "So long as there was any probability of the existence of hell it would be deemed advisable to lead a righteous life." And I would venture to say that so long as there is any reasonable probability of infection of mankind from animals, it is our bounden duty to adopt preventive measures and follow in the paths of sanitary righteousness. (Cheers.)

I desire to say one word to the delegates who have come from the local sanitary authorities. I appeal to them, as my late colleagues, not to be discouraged by the statement which has been made, and not in any way to relax their efforts, or to put aside reasonable measures to secure pure milk and wholesome meat for the public. (Cheers.) We are not merely waging war against what I regard as an immoral traffic in "wasters" or "piners." We are not merely concerned with the question of the tubercle bacillus in dairies. I want to see sanitary measures encouraged and enforced because they have a far-reaching effect. We are aiming at a high standard of cleanliness and purity, and I am convinced that if you will continue to persevere in those efforts, and if you will use your best endeavours also to relieve the over-crowding in towns, and to improve the condition under which the working classes live, and to secure more light and air, you will be the silent instruments by which we may hope to stamp out this terrible scourge of tuberculosis. But if you, who are responsible for the sanitation of this country, neglect these efforts, if you abandon the policy which we have adopted hitherto, I say that England, the country which has for so many years been regarded among the nations of Europe as the pioneer of sanitary reform, will no longer deserve to hold that position. (Loud cheers.)

Professor SIMS WOODHEAD: Sir James Crichton-Browne, Lord Lister, Ladies and Gentlemen: I shall not abuse your confidence, I hope, for more than a minute or two, if I am allowed to say a few words in support of the Resolution that has been so ably proposed to thank Professor McFadyean for his very able and, shall I say, very temperate address. We have all listened to it with very great pleasure indeed, and I cannot help looking back to the time when I first knew Professor McFadyean as a fellow-student. I

could not help thinking what an enormous amount of work he has done between that period and now. I shall only say but one thing, and that is in connection with what our Chairman said yesterday afternoon. He put to us a question which he had put to the late Sir Richard Thorne-Thorne, asking, If there is all this danger, why are we not all affected? It has been stated, I believe, that nearly 50 per cent. of the people of this country are, have been, or will be affected with tuberculosis. That is a very serious statement to make, and at first I could scarcely realise that it could be possible. But if you remember, ladies and gentlemen, that there are 60,000 people die from some form of tuberculosis annually, that a considerable number of these are ill for years before they die, that there are many serious cases of tuberculosis which ultimately recover, and that we know nowadays that there are many cases of tuberculosis which are never discovered during life, or even sometimes after death, you will therefore see that we do not escape tuberculosis in anything like the degree that is popularly supposed. And if it is true that 50 per cent. of us are at some time affected by tuberculosis, I think it behoves us to enter very carefully into those measures, however small the proportion of the cases may be, which may prevent any single form of tuberculosis. There are many cases in which there is practically no lesion, that is, damage to any part except those parts of the system connected with the intestinal canal. In certain of the statistics to which Professor McFadyean has referred, those of Dr. Shennan and Dr. George Still—or, at any rate, in connection with Dr. Shennan's—I had an opportunity of making 127 of the post-mortem examinations and of recording the results. Dr. Shennan says that a very considerable percentage of cases result undoubtedly from infection of the alimentary canal. I wish all of you could have heard what we heard in the Pathological Section this morning from the gentleman who seconded the proposal. He made it clear to every one of us that, as the result of three years' hard work and most accurate observation, there was undoubtedly danger of infection from the bovine to the human subject, and he also showed most carefully that there can be an inter-communication in both directions; that it is possible in many cases to produce the disease directly; and, although many failures occur, still there is a sufficiently large proportion of successful cases to indicate the very great necessity that we should take care in dealing with the subject to relax no effort, but to increase our efforts, and to accentuate in the popular mind the necessity for looking upon bovine tuberculosis as a very great danger to the human public health. I have very great pleasure therefore in supporting the Resolution. (Applause.)

The Resolution was put and carried by acclamation.

Mr. MALCOLM MORRIS then rose and said: My Lords, Ladies and Gentlemen,—I have only just this little request to make to you, viz., that, as the main object of this Congress is the diffusion of knowledge, you should not leave to-morrow or to-day without taking with you copies of the various addresses and of the various papers which have been delivered, in order that

you may have the opportunity of spreading them in your own towns, so that the work which has been done here shall not be for the benefit of single individuals, but should be diffused throughout the whole country as far as possible. I may mention that many thousands of Professor McFadyean's address have been printed, and I will ask all of you to take several copies with you, so as to propagate it throughout the country. (Cheers.)

(The proceedings then terminated.)

FIFTH GENERAL AND FINAL MEETING.

The FIFTH and FINAL GENERAL MEETING was held in the QUEEN'S HALL, at 3 P.M., on Friday afternoon, JULY 26th, 1901.

The EARL OF DERBY, K.G., who was in the CHAIR, opened the proceedings by speaking as follows: My Lords, Ladies and Gentlemen,—We have now reached the last stage of the official proceedings of this Congress, and it becomes our duty to submit to you certain resolutions which will be proposed to you in due course. Although the Congress has met under circumstances of special and lamentable difficulty, with the loss of one who was to have been our President, who is debarred by his exalted position from coming here, it has nevertheless achieved a success, as we hope and believe, which will render it one to be remembered amongst the history of similar congresses in the world. We in the first instance desire to recognise the cordial manner in which those whom we have had the honour of welcoming to our shores have availed themselves of the invitations which were extended to them. They have added an interest and a grace to our proceedings which we should have felt were strangely lacking if they had been absent, and we trust that in time to come, should another congress be held here, the memory of this one wil operate to bring our foreign friends once more to the shores of a country which assuredly will welcome them. (Cheers.) We have a good deal of business to do this afternoon, and it is therefore better that I should not take up your time with any preliminary remarks. The Congress has been a large one, fully attended. Over 2,500 persons have joined the Congress, and the subjects discussed have not been inferior to those which have been presented to similar congresses at any time. We now only hope that some definite result will accrue from our conference. If we were simply to have met, whatever the pleasure of it, if we were simply to have discussed these matters, with whatever interest, no very definite result would have been achieved; we hope, therefore, that the resolutions which will very shortly be submitted to you will be approved in the main by our audience. We trust that this Congress will be able to separate with a feeling that after all they have done something to promote the welfare of their country, that they have done something to deal with this great question, and that they have contributed their mite, small as it may be, to the general knowledge, experience, and, we hope, the benefit of the world. (Cheers.)

Mr. MALCOLM MORRIS (*Hon. Secretary-General*) then proposed the first Resolution as follows: My Lord Derby, my Lords, Ladies and Gentlemen,—I have first of all to read to you the first Resolution, which I have the honour myself to submit to this meeting. The Resolution is: "Tuberculous sputum is the main agent for the conveyance of the virus of tuberculosis from man to

man: indiscriminate spitting should therefore be suppressed." (Cheers.) It is not a particularly pleasant subject with which to commence this meeting, but it is the key to the question, and we must put aside the question as to whether it is a pleasant subject or not, and come boldly to the point and carry the resolution. We must tell the world distinctly and clearly that indiscriminate spitting, especially in public places, in all enclosed places where people congregate, is not only a disgusting and a filthy habit, but a dangerous one to human life. (Cheers.) If nothing else comes out of this Congress—if after all the work that has taken place here this one fact comes about, that the public learn that by spitting indiscriminately in enclosed places they are doing themselves, their wives, and their families a deep injustice and injury—then this Congress will not have been held in vain. (Cheers.) I am certain that the ladies who have attended this Congress will agree to this resolution. (Hear, hear.) They suffer from men's filthy habits, and they will support us in this Resolution, especially when we tell them that when they walk in the streets with their long skirts they pick up particles of poison and carry them into their houses. Without further preface I beg to propose this Resolution: "Tuberculous sputum is the main agent for the conveyance of the virus of tuberculosis from man to man: indiscriminate spitting should therefore be suppressed." (Cheers.)

Mr. HAROLD SWITHINBANK, who was called upon to second the Resolution, said: My Lords, Ladies and Gentlemen,—It is with very great pleasure that I rise to second the motion which had been put before you so ably by our Secretary-General. I do so with the greater pleasure because the Resolution may be said to crystallise the efforts which the National Society for the Prevention of Consumption have, during the past three years, made to put a stop to the habit of indiscriminate spitting. I think this habit has been allowed to go on too long. We allow to be scattered broadcast through our streets a poison, the deadly nature of which has been proved by such men of scientific eminence as Professor Brouardel, Professor Koch, and others. As Mr. Malcolm Morris has put it, this poison is swept up by every lady's dress; it is swept up in the air by every gust of wind, and every man, woman, or child who travels much by rail, or who walks on the platform of a station, inhales it into the system. Yet the law says nothing. But if a piece of orange peel is dropped on the ground on the sidewalk by a little boy, and a broken limb results, there is a howl of righteous indignation throughout the whole world, voiced by the press, and the little boy gets severely punished by the law. Yet we allow this poison to be distributed in our streets broadcast! If you ask why, you receive the reply, "Well, a man must spit." That may be so, but I claim he has no right to spit in such a way as to be a danger to the public health, and I think it is the duty of the community to see that he does not do it. (Hear, hear.) We have here representatives of some of those great municipal bodies of which this country is so justly proud, from every part of this country. Is there not one of those municipalities which will have the courage to take the first plunge?—for plunge it is.

It has been taken by our cousins over the water. You know what New York has done. You heard Professor Brouardel quote a case the other day where even a ubiquitous millionaire was imprisoned for a second offence, after being fined for the first. That great dependency of Canada, of which we are so proud, and with which our President was connected happily for many years, has followed suit. In Toronto it is a penal offence; in Ottawa they are about to pass a law, if they have not done so at the present moment. Halifax and Nova Scotia have done the same. In Sydney—to go to the other side of the world—every man who is found spitting in the public street is fined £1, and yet in this country we sit still and allow it to go on. You heard yesterday Sir James Crichton-Browne quote that admirable, concise, practical telegram which was sent by the State of Wisconsin to its representative in this country, in reply to the telegram sent by him after the second General Meeting the other day. It was: "Telegram received; experiments commence to-morrow." Is there no great municipal authority in this country which, after reading to-day's proceedings in to-morrow's press, will telegraph and say, "Point seized; prevention begins to-morrow." (Cheers.)

The Resolution was then put and carried unanimously.

Professor SIMS WOODHEAD, M.D., as the proposer of the second Resolution, said: My Lords, Ladies and Gentlemen,—I beg to propose the second Resolution—"It is the opinion of this Congress that all public hospitals and dispensaries should present every out-patient suffering from phthisis with a leaflet containing instructions with regard to the prevention of consumption, and should supply and insist on the proper use of a pocket spittoon." This resolution is really a corollary to the one which has already been passed so heartily. We all know that poison is not a very dangerous thing if we keep it corked up in a bottle, and the resolution to which I am to speak is a resolution to the effect that we shall put all the poison into a bottle and keep it there if possible, and that further we shall tell people how to put it there, and what to do with it when they have got it. It is an exceedingly important question with which this Congress has been dealing. Those who heard Professor Koch's eloquent address the other day cannot but feel that after all this is the question of the hour. I have very great pleasure in proposing this Resolution, because I know from actual experience that the material which it is proposed to put in these bottles does contain an enormous number of tubercle bacilli, which we are all agreed are exceedingly active and dangerous.

Sir WILLIAM BROADBENT, who seconded the Resolution, said: My Lords, Ladies and Gentlemen,—I shall be happy to second that Resolution, because, as an old hospital physician, I know that these out-patient departments are being made the seats of the actual spread of disease. Nowhere is information of this kind more necessary than in the out-patient departments of hospitals, and a measure of this kind is therefore of the first necessity.

The Resolution was then put to the meeting by the Earl of Derby and was carried by acclamation.

Dr. NIVEN, the proposer of the third Resolution, spoke as follows: My Lords, Ladies and Gentlemen,—I beg to move, "That the voluntary notification of cases of phthisis attended with tuberculous expectoration, and the increased preventive action which it has rendered practicable, have been attended by a promising measure of success, and that the extension of notification should be encouraged in all districts in which efficient sanitary administration renders it practicable to adopt the consequential measures." In dealing with such a large question as the notification of phthisis, I scarcely know where to begin, but I can scarcely do wrong in saying that this practical measure has been adopted by our American cousins with conspicuous success in the great city of New York, and that they have carried on with ever-increasing efficiency a large measure of notification of phthisis since the year 1893. Although we ourselves had urged this measure even before that period, we had not been successful in getting any great municipality to adopt it up to the year 1899. In that year three large towns adopted the voluntary notification of phthisis. As you are aware, in New York notification of phthisis is compulsory, but for the first few years the city of New York also was under the system of voluntary notification of phthisis. It may be questioned whether it would be wise in any large town to adopt the compulsory notification of phthisis before making themselves acquainted with the practical difficulties of administration. (Hear, hear.) The three places which did adopt voluntary notification of phthisis in 1899 were the town of Brighton, the city of Manchester, and the city of Sheffield. I should like to take this opportunity of paying my tribute to the admirable work which has been done in Brighton and Sheffield by the Medical Officers of Health, Dr. Newsholme and Dr. Robertson. Voluntary notification came into operation in Manchester in the autumn of the year 1899. Not to enter into many details, the Corporation of Manchester appointed two medical assistants to the Medical Officers of Health, Dr. Harold Coates and Dr. McLeary, now the Medical Officer of Health for Battersea, and a scheme was drawn up which embraced a great many points. When a case is notified by a practitioner, these gentlemen, armed with a large form of investigation, go out and see the patient at his own home. They enter into elaborate enquiries into the history of the infection; they give personal instructions in the methods and precautions which are required to be carried out; they observe minutely the conditions of the house, and they make a note of the measures of disinfection to be performed. They then bring this report back to the office. The further administration is carried out by an organisation of twenty-eight sanitary inspectors and fifteen lady health visitors belonging to a voluntary society, the Ladies' Health Society of Manchester. (Cheers.) A lady from this Ladies' Health Society, or a sanitary inspector, goes to the house and minutes exactly the rooms and the articles to be disinfected. I may say at this point that the great practical value of this measure has been attained through the careful investigations of our Professor of Pathology,

Professor Delépine, who has made many valuable contributions to this subject, and through whose investigations of the practical methods of disinfection we have been able to do so much. The house and the articles which have been exposed to infection are disinfected in different ways adapted to the degree of infection which has taken place. I do not think I need go into the matter, except simply to indicate that our methods are adopted with the object of removing the amount of infection which we know must be present in the house. I should like to say further that we have had between two and three thousand cases of consumption notified, and that in the later period we have been able not only to get practically the whole of those houses disinfected, but also all houses in which deaths from phthisis have occurred, without any great degree of friction arising with the people or the property owners. (Cheers.) In fact, although we have legal powers to obtain disinfection, we have thought it wise to appeal to the property owner voluntarily to submit the houses belonging to him to the operations of the Corporation. In almost every instance I am very pleased to be able to say we have obtained the co-operation of the property owner. I really do not anticipate that, with a judicious method of administration, with carefully selected officers, with notification worked in a conciliatory spirit, there will be any great difficulty in carrying out a public system of preventing phthisis under a system of notification, namely, by investigating the source of the disease and removing it, by instructing the people by word of mouth through skilled medical men in the precise measures which they are to carry out, and by getting those houses disinfected which require disinfection and in the manner best adapted to remove the infection. I beg therefore to move, "That the voluntary notification of cases of phthisis attended with tuberculous expectoration, and the increased preventive action which it has rendered practicable, have been attended by a promising measure of success, and that the extension of notification should be encouraged in all districts in which efficient sanitary administration renders it practicable to adopt the consequential measures."

Professor Clifford Allbutt, M.D., F.R.S., who was then called upon, said: My Lords, Ladies and Gentlemen,—I am glad to have the opportunity of seconding this resolution, if it were only for one thing. Dr. Niven, of Manchester, has paid a tribute of gratitude to two towns in England out of the three which have done very good work in moving in the direction of voluntary notification; but he has been silent about his own work in Manchester, and I am sure you will feel with me that we must not allow his modesty to let him be forgotten in this respect. I have, perhaps, some excuse for speaking in this way of Dr. Niven's work, because one of my candidates for degrees within the last few weeks has presented for his degree at Cambridge a digest of about a thousand of these notifications, by Dr. Niven's kind permission. A great many very remarkable and important results are coming out from those figures, which it is not the time to enter into fully now. What we might have expected has occurred, that certain ill-ventilated workshops and other places of congregation appear to be centres from which phthisis was distributed, and that in one or two

instances it appeared so far that an outbreak occurred in such places from the time they were known to be frequented by one or more phthisical workmen. I should hesitate to say that any ill-feeling or any alarm were created as regards the individual originating such a centre of infection; that is the justification of voluntary notification. It is perfectly easy, without exercising any improper pressure, or acting in any unbecoming way towards the individual, to enable him, on the basis of the previous resolution that you have already carried prohibiting indiscriminate spitting, to attend to his work, and to follow his occupation in his workshop under exceedingly simple and easy conditions. I have very much pleasure in seconding the proposition.

Dr. ACLAND here asked: Might I venture to ask whether it would not be better, in these two motions, to substitute the word "tuberculosis" for "phthisis"? It makes it more comprehensive. I take it that all tuberculous discharges are equally contagious.

Dr. NIVEN replied: We very carefully considered that question, and thought that phthisis was the most urgent. The subject is so vast that I think it would be undesirable to load it with other forms of tuberculosis until we have reduced the disease.

The Resolution was then put, and carried unanimously.

The proposer of the fourth Resolution, Sir JOHN BURDON SANDERSON (Regius Professor of Medicine, Oxford), said: My Lords, Ladies and Gentlemen,—I beg to move, "That the provision of sanatoria is an indispensable part of the measures necessary for the diminution of tuberculosis."

The Resolution which I have to propose to you joins on to the one which we have just been considering, and which you have accepted. It relates to the provision of sanatoria for the poor. (Hear, hear.) I shall trouble you with very few observations on the subject, because I cannot possibly enter into the full discussion of so large a subject, and I must state very precisely what the view of the section which has sent it to you is upon the subject. You will see that the purpose we have in view is to place before you, not details, but merely principles. You will see from the wording of the resolution that it relates to two things—namely, to sanatoria, and to people who are to be received into those sanatoria. We all know that sanatoria are of the greatest value, not merely to the poor, but to all classes of the community, and we are interested in their prosperity in that general way. But more especially it is our duty to promote the establishment of sanatoria for the poor. (Hear, hear.) What I mean by sanatoria for the poor is not for the poor generally, much less for those in receipt of parochial relief, but for the poor workman, that is to say, for the workman whose earnings are quite sufficient or just sufficient to cover the necessary expenses of his life, but who is too poor to make proper provision for the future, and especially the great calamity of sickness. (Hear, hear.) In defining, therefore, the sanatoria of which I speak, you will understand that I mean cheap sanatoria—sanatoria into which the sufferer can

be admitted promptly and freely, and in which the cost does not exceed something like from 15*s.* to £1 a week. What we require is sanatoria, not perhaps all over England, but in the neighbourhood of all industrial centres. (Cheers.) As yet, as you know, very little has been done in this country with this view. You will see that what is essential is that the sufferer should be admitted at once, and on no other ground except the ground of illness, into these sanatoria. Now we can speak of the benefit which is to be derived from such admission on extremely good grounds. We are well aware, and we have had abundance of evidence given us in this Congress, that the great experiment which has been made in Germany is a success—that is to say, that if you can provide a workman who is in the first stage of consumption, in the early stage of consumption, when he is not ill, but merely weak, that is to say, passing into such a condition of things that he is no longer able to do a full day's work—that if you can provide such a person with a resting-place, a place where he can enjoy the three items which are necessary for his improvement, namely, rest, good food, and good air, and I might add to them agreeable surroundings—then you do the best that you can do to preserve his working power. It is very desirable that we should very clearly understand what we hope to effect. What we hope to effect is not so much the cure of the disease, in the English sense of the word, as the restoration to the workman of such an amount of health as will enable him to continue his work. Now the facts which we are in possession of, and which we have gathered from the experience of Germany—which I presume everyone here knows has carried out the system of sanatoria for the poor for from six to ten years—we know that if we follow that course we can prolong the life and particularly the earning power of the consumptive workman. Whereas in general one may say with perfect truth that a workman who is suffering from pulmonary consumption cannot look forward to more than two or three years of life for certainty, the probability is that if he is sanatorially treated he will at the end of such a period be still able to earn successfully, that is to say, still to maintain himself and his family. Now, ladies and gentlemen, simply consider this. We have a tremendous evil. There are a very large number of persons in this country, numbering perhaps very many thousands at all events—I will not venture to make an estimate of the number—persons who are in the condition which I have described. Secondly, we know that if we had sanatoria for the poor of the kind that I spoke of just now, we should lengthen their lives, and particularly we should lengthen the time during which they are able to maintain themselves and their families. That being the case, it is unquestionably our duty to do all that we can, without for a moment expressing any opinion as to the way in which it is to be done, and as to where the resources are to be found to establish sanatoria for the poor all over England, and particularly, as I said just now, in our industrial centres. (Cheers.)

Sir RICHARD DOUGLAS POWELL seconded this Resolution in the following words: My Lords, Ladies and Gentlemen,—I think it is quite

unnecessary for me to add any words to those which have been spoken so eloquently by Sir John Burdon Sanderson in support of this Resolution. I think he has covered the whole practical ground, and I have much pleasure in seconding the Resolution.

The Resolution was then put, and carried with one dissentient.

Sir HERBERT MAXWELL, M.P., then proposed the fifth Resolution: My Lords, Ladies and Gentlemen,—I beg to move, "That in the opinion of this Congress, in the light of the work that has been presented at its sittings, Medical Officers of Health should continue to use all the powers at their disposal, and relax no effort to prevent the spread of tuberculosis by milk and meat." (Hear, hear.) I think of all the resolutions which have been or are to be submitted to you this afternoon, this is perhaps the only one which an unprofessional man like myself can venture to move. It is one in which I have a peculiar interest, inasmuch as I had the honour of being the Chairman of the Royal Commission on Tuberculosis which reported two years ago. The inquiry of that Commission was directed upon a matter which had already been reported on by a previous Royal Commission. We relied very much on the experiments conducted by the distinguished members of that Commission. We travelled in the course of our own inquiry to most of the countries of Western Europe, and we found that the conclusion to which that Commission had come, and to which we ourselves were led, was assumed to be, I might almost say, *chose jugée*—namely, the communicability of bovine and human tuberculosis. We have learned this week that this must still be regarded as a question, and those who heard the magnificent oration of Professor Koch on the one hand, and of Professor McFadyean in this hall yesterday afternoon on the other hand—(cheers)—will perceive that, like other questions, it has two sides to it. (Hear, hear.) If you accept this resolution you decide nothing. You are asked to pronounce no opinion, save that it would be unwise to abandon the precautionary measures which an enormous preponderance of scientific opinion, supported by legislative action, has endorsed throughout civilised Europe, until the negative is proved. (Cheers.) I will not venture deeper into the subject than that. I have only said so much in order that you might perceive that you are not asked to commit yourselves to any new line of action in supporting this Resolution, only to press that the present reasonable precautions should be maintained until further progress has been attained towards the truth.

Earl SPENCER, on seconding the Resolution, said: My Lord Derby, Ladies and Gentlemen,—I am very proud to associate myself with Sir Herbert Maxwell in what he has said on this highly important question. I had the privilege yesterday of addressing a few words to you on this very subject. I said, in terms not very different from those he has used to-day, that I thought it was of the highest possible importance that no change should be made in the precautions which are being taken, and which many people in this room have encouraged all over the country to prevent the sale of milk

from diseased animals. I only repeat that to-day. I should like to add one word taken from an admirable speech which we heard from Dr. Niven, who represented an experiment which has been so successful in Manchester. He alluded to what he called a "judicious method of administration." I should like to urge that upon all those who have to act in this matter. Sometimes we have not judicious methods of administration. Methods of administration, I know, in this country have from time to time been adopted which had no elasticity in them, and a very rigid application of certain laws in cities was applied to country districts where the same circumstances did not exist. (Hear, hear.) I am not, by saying this, saying that in any place you ought to depart from certain broad and general principles, but I am quite sure that if you want to get successful administration in a country you must have a certain amount of elasticity, and if I might add of good sense, in your regulations. (Hear, hear.) I most strongly support the views which have been ably spoken to by Sir Herbert Maxwell, and I will not say any more, other than simply second the Resolution which he has proposed.

Mdlle. ADRIENNE VEIGELÉ, rising in the body of the hall, said: Before the Resolution is put to the meeting I should like to say a word on behalf of vegetarianism. I believe that if the medical profession would study the value of vegetarian diet, they would do a great deal towards stamping out this disease.

Dr. HERON then proposed an addition to the Resolution, saying: I should like to suggest that something should be added to the Resolution. (Hear, hear.) I do not wish in any way to discuss this subject, which is a very burning one, and one which cannot be fully discussed with advantage in an assembly such as this. But I think it might be to the advantage of all concerned if some such addition as this were made to the Resolution:—"And that, in view of recent authoritative statements, steps should speedily be taken to commence an experimental inquiry, to be conducted by competent men, and as speedily as may be brought to a conclusion." (Cheers.) I do not think it is necessary for me to dwell upon this at any length, because I hope these words convey a definite and perfectly clear meaning to everybody. They do not pledge this meeting to any particular expression of opinion, except this—and I think a most important expression of opinion it will be under the circumstances—that we wish to know, as speedily as may be, what the meaning of the very grave statement which was made by one of the greatest scientific men of the day really means, and this will never be done by speaking; it can only be done by experimental inquiry properly carried out by men competent to do it. I think the matter is of such vast importance, such immense importance, from any point of view from which you choose to look at it—from the point of view of health, from the point of view of expenditure—that it ought to be impressed upon the Government, and they ought to be told by men of their own party, and by men of all parties, that this is a thing which must be attended to, and with the least possible loss of

time. I beg leave to move the words I have read as an addendum to the Resolution.

The CHAIRMAN then said: As that is an addendum to the Resolution, there is nothing to prevent me putting the original Resolution to the meeting.

The Resolution was then put, and carried unanimously.

Mr. MALCOLM MORRIS said: I may say that I have a Resolution in similar terms to the addendum suggested by Dr. Heron. It is, "That in view of the doubts thrown upon the identity of human and bovine tuberculosis, it is expedient that the Government be approached and requested to institute an immediate inquiry into this question, which is of vital importance to the public health and of great consequence to the agricultural industry."

Dr. HERON said: I accept that, and beg leave to propose it.

Dr. J. S. LLOYD, M.R.C.V.S., said: I beg to second that. It will give the utmost satisfaction to everybody concerned, both the public, the agriculturists, and the veterinary surgeons.

This Resolution, in place of Dr. Heron's addendum, was then put, and carried.

Dr. FARQUHARSON, M.P., said: My Lords, Ladies and Gentlemen,—As a humble member of the Legislature I should like emphatically to support the resolution which we have just heard. I regret to say that the responsible Minister in charge of our sanitary affairs, when questioned in the House of Commons yesterday, put down his foot, and emphatically declined to start any investigation of that kind. But we cannot put back progress, and we cannot ignore the enormous authority of Dr. Koch in matters of this kind. I think we have done well and wisely to maintain the *status quo*, enabling Medical Officers of Health to continue their sanitary measures, which have been attended with such immense advantage, until we get some decision. I am most strongly of opinion, and I will most emphatically state in the House if necessary, and back up those of greater authority than myself who bring their greater authority to bear upon the Legislature, of the urgent necessity, if I may call it, of having some inquiry of the kind suggested. I see on the platform my friend Sir James Blyth, the greatest authority, I suppose, outside scientific men, on matters of this kind, and he, I believe, has expressed his wish and desire to help in this investigation. I hope and trust that this great and successful Congress, now approaching its satisfactory conclusion, will place a crown on its proceedings by emphatically stating that they think it necessary that some further investigations should be carried out on this great and all-important question.

Mr. WILLIAM FIELD, M.P. (Dublin), speaking from the back of the hall, said that he thought it would be much better if a Royal Commission of medical

experts were appointed, who would probably come to some kind of conclusion which would satisfy the public mind on the subject. There is an enormous interest at stake, and those who wish to have this Commission desire that the public should be satisfied, and the welfare of the community carried out.

Mr. FIFE, speaking on the same Resolution, said: I think that more than one section of the officers of local authorities who are interested in endeavouring to put down tuberculosis throughout the country should be mentioned in the Resolution. We all know that there are veterinary surgeons who are attached to local authorities, and also sanitary inspectors who have statutory powers under the various Acts and Workshops Orders to carry out powers under the local authorities and administration for that purpose. I think, therefore, that these sanitary inspectors and veterinary surgeons of local authorities would desire to be backed up in their strong and conscientious efforts to do all they can in the undertaking of their duties. I therefore beg to move that you add the following words to the addendum: "Veterinary surgeons of local authorities and sanitary inspectors."

The CHAIRMAN here stated: As a matter of form it will be impossible to add that to the Resolution at the present time, because we have already passed that part of it without amendment. The part of it which is now under discussion, and to which I must ask speakers to confine themselves in their amendments, is: "That in view of the doubts thrown upon the identity of human and bovine tuberculosis, it is expedient that the Government be approached and requested to institute an immediate inquiry into this question, which is of vital importance to the public health and of great consequence to the agricultural industry." Perhaps the hon. gentleman can show me some way in which veterinary officers can be brought into that amendment?

Mr. FIFE said: I shall be satisfied with that.

Mr. POTTIE said: Would it be possible to bring in this addendum: "That sanitary officers may be free from their present liability in respect of their efforts to prevent the sale of tuberculous milk." (Cries of "No, no!") I might mention that yesterday the Medical Officer of Health of Warwick was the subject of a vexatious slander action in the execution of his duty.

The CHAIRMAN said: I think I shall have to ask you to postpone that amendment, as it is a difficult matter, and one dealing with law.

Sir JAMES CRICHTON-BROWNE, the proposer of the seventh Resolution, said: My Lords, Ladies and Gentlemen,—The resolution I have to propose is: "That the educational work of the great National Society for the Prevention of Tuberculosis is deserving of every encouragement and support. It is through their agency that a rational public opinion may be formed, the duties of public health officers made easier of performance, and such local and State legislation as may be requisite called into existence."

I think two words inscribed on the banner of this Congress, if it happened to have one, would be "Prophylaxis and Sanatoria." No doubt under each of these there are diverse measures and operations included, but they can all be classified under Prevention and Cure. Indeed, I think I could sum up the story of this Congress and the aim and work of our National Association in one word—"Enlightenment": enlightenment of our towns and dwellings, of our slums and hovels—for with the sunshine comes fresh air, and before their combined forces disease-breeding bacteria fly away—enlightenment of the minds of our people, so that prejudice and ignorance may give place to an intelligent and rational knowledge of the causes of disease, and of the means by which they may be removed and counteracted. (Hear, hear.) Now in this work of enlightenment our National Association has done great work, indeed, I may say that since its origination, since the time when the King gave his countenance to it about two years ago, its progress has been phenomenal; and I think I may add that His Majesty has given a new impulse to our work by the kind, gracious, and encouraging words which he spoke yesterday. When His Majesty the King studies the reports of this Congress, as he says he will do, he will, I think, find that the spirit animating it has been one of hope and confidence. There have been no dismal forebodings, no sceptical questionings, no faltering actions. On all hands we have heard words of encouragement and sanguine anticipations of success, and I am sure that the note sounded in that magnificent address of Professor Koch, to which we listened on Tuesday, is calculated to inspire us with hope and courage in the work. I do think this great Congress is an episode in the work of the National Associations; but if they carry on their work in the future as they have hitherto done, we may look forward to that happy time when tuberculosis will be actually abolished, and will be only a painful and terrible memory of the past. (Hear, hear.) If the progress of science and of experimental research is left unembarrassed, we are not without hope of ultimately obtaining a remedy of that dread disease which His Majesty mentioned yesterday with so much feeling. Our National Association has carried on this great work of enlightenment and of education, and I have very great pleasure in proposing this Resolution.

Dr. Hillier, of London, who seconded this, spoke as follows: I can assure you I consider it a great honour to have been asked to second this Resolution. I do so with very great pleasure, and with the strong assurance that in seconding it I am supporting one of the most important resolutions which has been submitted to you this afternoon. As one of the editors of our journal, a great deal of the correspondence in connection with the Association has come in my way, and I have therefore been kept intimately informed of the work which is being done throughout the countries by the branches of this Association. I take it that in all measures, social or legislative, which may eventually be taken against the abuses associated with the spread of tuberculosis, the first and great essential factor in the problem is that public opinion should be with us. And in order to have public opinion with us it is necessary that the

public should be informed in plain English what it is it is asked to do. That work it has been the special function of our Society and of other similar societies to perform. I take it that the Government, as someone has said, may be regarded as a ship. The wind which fills the sails of that ship is the breeze of public opinion, and it is the special function of this and similar associations to fan that breeze. If there are any of you here who are not members of the Association, I trust you will give the matter your earnest consideration. The work of education is not only being done in this country, but similar work is being done in France, Germany, and in fact throughout all the civilised countries of the world. I hope and believe it will continue until this disease of tuberculosis is at least brought as completely under control as small-pox, if it is not driven away altogether, like leprosy, from every civilised country. In that belief, ladies and gentlemen, I beg you to support this Resolution, which I have much pleasure in seconding.

The Resolution was then put, and carried unanimously.

Sir WILLIAM BROADBENT said: My Lords, Ladies and Gentlemen,—The Resolution which I have to propose is—"That this Congress is of opinion that a permanent International Committee should be appointed—(*a*) to collect evidence and report on the measures that have been adopted for the prevention of tuberculosis in different countries; (*b*) to publish a popular statement of these measures; (*c*) to keep and publish periodically a record of scientific research in relation to tuberculosis; (*d*) to consider and recommend measures of prevention. This Congress is further of opinion that such a committee should consist of representatives to be elected by the great national societies formed for the suppression of tuberculosis, and also representatives nominated by the various Governments. It is further of opinion that all International Committees and great national societies whose object is the prevention of tuberculosis should be invited to co-operate."

This Congress is doing magnificent work; it is exciting public interest and spreading information. The benefits of this work are not confined to the vast assemblies which have met here and in St. James's Hall, and to the great work which has been done in the different sections; the influence of a Congress like this is not limited even to those who will be reached by the record of its proceedings. Its influence is seen already out of doors. Nothing is more striking than to see the headlines of our halfpenny newspapers—"Dangers of Spitting," "Necessity for Cleanliness," etc. In matters of this kind I think the usefulness of a Congress like this is of enormous importance. But it is not merely by occasions of excitement like this that tuberculosis is to be combated. A Congress may represent a pitched battle and a great victory; but the real work is done in marching, counter-marching, and arranging. What has to be done is to make this work continuous—not continuous only by individual associations such as our own, the National Association for the Prevention of Consumption, but to co-ordinate the work of all associations in every country, so that no work which is done in one

country may be confined to that country, but that it may reach every country. It is to this continuous campaign against tuberculosis that the Resolution I have the honour to move is directed. It has been carefully thought out. Every one of these measures has its special purpose, its special object; and I think the Congress will cordially agree to this proposal that a permanent International Committee should be appointed to carry on the work which has not been begun here, but with regard to which an important part has taken place here.

M. BROUARDEL said: I very gladly rise to support the Resolution which Sir William Broadbent has put to you. I feel convinced, and have already spoken on this point, that we ought to know of all the efforts which are being made by other countries in order to profit by them in our own. But this cannot be accomplished unless we have somewhere a general bureau, a general international association to collect information from all parts. If this association is very active, and also if it finds equally active correspondents in the different nations, we may be assured that, by the co-operation and amalgamation of all associations and the power which they possess, we shall have made a great advance in the struggle against tuberculosis.

The Resolution was put from the Chair, and carried unanimously.

Professor CROOKSHANK said: My Lord Derby, my Lords, Ladies and Gentlemen,—I shall be very brief in proposing the Resolution standing in my name: "That in the opinion of this Congress overcrowding, defective ventilation, damp, and general insanitary conditions in the houses of the working classes diminish the chance of curing consumption, and aid in originating and spreading the disease."

The Resolution is a purely uncontroversial one, and will, I venture to think, meet with very wide acceptance. After such a Congress as this, it is a matter of general knowledge that the inoculation of tubercle bacilli into perfectly healthy experimental animals will invariably induce tuberculosis; but you must not go away with the impression that therefore every individual who may come into contact with the tubercle bacillus must necessarily fall a victim to that disease. The human subject is very differently organised, and there must be a very large measure of insusceptibility, otherwise it would be quite certain that we should all fall victims to the disease, considering the prevalence of the tubercle bacillus. We recognise that there are certain predisposing causes, and therefore we must not confine our attention to the tubercle bacillus alone, but we must pay much more attention to other factors in the production of tuberculosis. Professor Brouardel in his eloquent address pointed to the effects of intemperance as a predisposing cause of tuberculosis. We know that illnesses of various kinds and colds, chills, and excesses—conditions which lower the vital resistance of the body—predispose to tuberculosis. It is obvious, therefore, that we shall do right in supporting a resolution which will diminish the conditions which predispose to tuberculosis,

and diminish also the opportunities for infection. This Resolution will greatly strengthen the hands of those who desire to see the better housing of the working classes. This question is not one which merely affects slums in cities, but it is one which is very pressing in rural districts. I speak as one living in the country, and those of you who live in the country know very well the kind of dwellings and cottages to which I refer. It goes against one's artistic feelings to point out these things, but we know perfectly well in the country how many most attractive cottages are in a state of artistic decay. We admire the roses in the garden, and the honeysuckle which climbs over the porch; but when we go into those cottages we find them with low ceilings and very badly ventilated; we find them in some cases with floors of cold paving-stones, and with damp walls with the paper peeling off, and even with green and black fungi making their appearance on the walls. Those are the conditions which are favourable to the development of bacterial flora, and they are the conditions which we must get rid of to prevent the growth of the tubercle bacillus. (Applause.)

Dr. THEODORE WILLIAMS said: Ladies and Gentlemen,—It is with great pleasure that I second this Resolution, and I do so very strongly, because I think the subjects contained in it have not quite sufficiently been looked after in the midst of other subjects. We have been talking about the sputum; we have done a great deal to do away with contagion, and so forth; but we have almost forgotten the leading, the great causes which bring about the state of things called consumption. It is not because the tubercle bacillus attacks a man that he dies of consumption. There are lots of men and women into whom the tubercle bacillus gets, but they are not attacked at all. It is because he or she gets into certain depressed conditions, from various predisposing causes, that he or she is the subject of attack. It is the milliner, the tailor, and the printer, living under certain conditions in badly-ventilated rooms and without sufficient food, who fall an easy prey to the tubercle bacillus, which seizes hold of them and does its fearful work. My friend Dr. Denison spoke very sensibly this morning in one of the sections with regard to this matter. He said, supposing every individual in this great city had two thousand cubic feet of air to himself, it is very doubtful whether he would get consumption at all, because he would have plenty of air. But people do not have two thousand cubic feet of air. The great mass of humanity, certainly in this city, live within a very small number of cubic feet of air, and it is these predisposing conditions which make the individual ready to receive the bacilli attack. If you can improve the surroundings of working men, insist upon a larger air space, more appropriate food, and the avoidance of damp, you will go a long way towards the abolition of consumption. To do that is quite as important as doing away with spitting. It is all very well to do away with spitting, which is very wrong, and no doubt does a certain amount of harm, but if you would ventilate people's rooms and give them good food, you need not be so particular about other matters. I have great pleasure in seconding the Resolution.

Mr. St. John Ackers here interposed: I should like to appeal to the mover and seconder of this Resolution, and ask them to kindly consider whether to the lay mind the word "originating" will not be misleading. I would suggest some such word as "predisposing," or whatever the proper word might be. At other meetings of the Congress it has been distinctly laid down that you cannot originate a disease without the germ. I think to the lay mind that Resolution, as it stands, might be misleading. I earnestly hope that this slight alteration will be made.

The amendment was then put and carried, the Resolution then reading as follows:—

"That in the opinion of this Congress, overcrowding, defective ventilation, damp, and general insanitary conditions in the houses of the working classes, diminish the chance of curing consumption, and aid in predisposing to and spreading the disease." This was put in its amended form and carried unanimously.

Dr. Denison (Colorado) here interrupted: May I be permitted to suggest the addition of a single clause to this Resolution? We do not know what adequate ventilation is. It seems to me that this addition would make the Resolution more complete: "That it is extremely desirable that adequate and thorough investigation be made to definitely determine the minimum air space necessary for healthful life in living-rooms, halls, schools, and workshops for various classes of human beings, to the end that a groundwork for legislation may be provided, and, so far as ventilation and sunlight can accomplish it, tuberculosis be prevented."

The Chairman: The Resolution with regard to ventilation has just been passed, and I am afraid I must rule your addition to it as being too late.

Mr. Malcolm Morris (*Hon. Secretary-General*): The last General Resolution will be moved by Professor Brouardel, and seconded by M. Calmette. It is as follows:

"That while recognising the great importance of sanatoria in combating tuberculosis in all countries, the attention of Government should be directed to informing charitable and philanthropic individuals and societies of the necessity for anti-tubercular dispensaries, as the best means of checking tubercular diseases among the industrial and indigent classes."

M. Brouardel said: I rise to support the Resolution proposed by MM. Calmette, Landouzy and Letulle, in the name of the First Section.

It aims at treating tuberculosis at the outset of the disease. Experience has taught all doctors, from Hippocrates down to the present day, that a neglected cold may end in tuberculosis. This fact has been forgotten or overlooked for several centuries, but to-day we return once more to its consideration. But when a labouring man coughs or catches cold, he does not know that he is opening up the way for tuberculosis. He must be visited and

shown how to take care of himself; there must be dispensaries where he may be treated, and where he may obtain the necessary nourishment, and his family must be provided for while he is out of work. He should be taken into a dispensary before being sent to a sanatorium. These measures are especially necessary in industrial centres. These conditions, I believe, would prove powerful weapons in our hands against the disease, and experience has shown M. Calmette and other doctors that when a foreman or a workman tells any of his companions whom he hears coughing that he knows of a place where he can receive special treatment, he willingly goes, and the new dispensaries are more likely to be threatened with too many than too few patients. In voting for this Resolution, therefore, we may produce great good, and certainly can harm no one.

M. CALMETTE said: I have already explained in the First Section what are the aims and special functions of dispensaries such as I have established at Lille, a typical industrial centre. I believe that the propagation of these dispensaries is the first step we should take for the effectual undertaking of the struggle with tuberculosis in large communities. It is not sufficient to found sanatoria even in large numbers, because in these sanatoria we can only admit a limited number of tuberculous cases. We must choose for preference curable cases, that is to say, those in early stages.

When we have built dispensaries and treated curable consumptives, our social work will not be accomplished; we must then occupy ourselves with those who are not tuberculous; we must occupy ourselves with the education of the people of the industrial classes. This will be the work of the dispensaries. We must set them to work, not by medicine, not even by educated men going to the assistance of the patients, but by winning the collaboration of working men, prepared to go and spread among their companions the principles of a practical sanitary hygiene, by means of simple lectures suitable to their intelligence, and by good example. Under these conditions only can the dispensaries be actively efficacious. I repeat, this first step must precede the foundation of sanatoria, which should, however, accompany them and complete the work of the dispensaries.

The Resolution was agreed to.

Mr. MALCOLM MORRIS then said: There is one more motion, which is not, however, quite a Resolution in the ordinary sense. It is as follows:—

"That the following question be submitted for the consideration of the next Congress on Tuberculosis: The constitutional conditions of the individual which predispose to tuberculosis, and the means by which they may be modified."

Dr. ROBIN said: I beg to support the Resolution. We are all more or less exposed to tuberculosis, yet we do not all become tuberculous. This is because for its development a particular soil is needed, and special conditions of the organism which cause it to become suitable to the development of the

microbe. The conditions of the organs which predispose to its development are—heredity, alcoholism, different forms of debility known as organic decline, hereditary or acquired. But these conditions are united by a bond which is still unknown, but details of which we are beginning to be acquainted with. These are the particular troubles at the period of changes. It will be interesting to discover whether they can be modified by hygiene or by appropriate therapeutics, but if the problem were solved one could add to the treatment prescribed and usually employed by the Académie de Médecine, and individual treatment, which would make it possible to study the constitution of individuals suspected of a predisposition. The prophylaxis would not be complete without a concurrence of the two elements. Thus I give my support to this Resolution, and beg the Congress to adopt it.

Sir WILLIAM BROADBENT said: I have much pleasure in seconding this Resolution. Its object is to direct attention to a point which has been somewhat neglected or lost sight of up to the present. No one could have imagined that so much could be said about tuberculosis, or that its effects could be so varied as we have seen in the Museum upstairs. The part played by the tubercle bacillus has been fully discussed; its presence in sputum, and possibly in other media; the way in which the soil is prepared by bad hygiene, by imperfect ventilation, and by alcohol. All these have been fully discussed, but there has been left out of sight altogether the individual predisposition. As Professor Robin said just now, we are all more or less exposed to the tubercle bacillus. I suppose there is no one in this room who has not inhaled millions of tubercle germs. Some of us contract the disease; others do not. And there is a reason for this, quite outside the predisposing causes which have been enumerated—bad ventilation, bad food, and bad habits of all sorts. This, then, is a subject for further investigation. With regard to individual predisposition, we know that heredity was supposed to play a very important part in consumption. We have dismissed heredity as such, but there is something in the idea that in one family the members suffer from consumption, while in another family they do not, and there remains for investigation this individual predisposition. Already there is an indication that we can identify those people who are predisposed to tuberculosis, and possibly if before the actual implantation of the disease those individuals can be identified, something can be done, not merely to cure them when they get the disease to which they are predisposed, but to prevent them getting it altogether. It is therefore with great pleasure that I second the Resolution which directs the attention of any future Congress to this important subject which has been suggested by our distinguished colleague, Professor Robin.

The Resolution was put and carried.

Mr. CAMERON asked: I should like to ask whether the Veterinary Section has no Resolutions to propose?

The CHAIRMAN replied: No Resolution has been submitted, as far as I am aware, from that section. Of course it is open to anyone in the meeting to move it.

Mr. BOWEN-JONES (Shrewsbury), rising from the body of the hall, said: My Lord, Ladies and Gentlemen,—I am rather surprised to hear from the Chairman that no Resolutions have been laid before the Committee of Selection from the Veterinary Section, because a series of Resolutions and suggestions with respect to future legislation with regard to milk and meat were almost unanimously accepted by that section of this great Congress. Those Resolutions were submitted to that section by myself, and were very fully discussed, both on Wednesday and Thursday. It was my belief when I came into this hall that those suggestions would be brought forward by the Chairman of the Veterinary Section of this Congress. But as that has not been done, and as a subsequent Resolution dealing with this branch of the question, which was proposed by Sir Herbert Maxwell and seconded by Earl Spencer, was passed, and as after that another Resolution was accepted which practically asked for an inquiry into the questions as to the accuracy of Dr. Koch's views, it appeared to me that I should be almost ruled out of court if I suggested further legislation at the present moment. The Resolutions are in the hands of most of the members of this Congress, and if your lordship thinks they are in order I shall be prepared to propose them. But if not, I will of course submit dutifully to your ruling, and take the opportunity on some future occasion, when this difficult question is settled one way or another, of submitting them to a future meeting of this Congress or some other body, which will enable them to be brought into law. (Cheers.)

The CHAIRMAN said: Perhaps I had better explain that the Resolutions which have come before this meeting to-day are Resolutions which have come up from the sections, and have been passed by the Executive. There are a large number of Resolutions from the sections which time renders it impossible to deal with. These Resolutions from the Veterinary Section, while I admit their importance, go into considerable detail and into subjects of controversy, and it was thought it would be difficult to properly discuss them in so large a meeting as this. There was no intention, I am informed, of setting them aside, and it is simply for the reason I have given that they are not on the agenda to-day. It is perhaps not known, but I speak on authority, that a number of these Resolutions which came from the sections have been sent to the persons to whom they are of interest, and will be published in the proceedings. It is only for the purpose of convenience that we did not bring matters of great detail before a meeting like this, where we are dealing rather with questions of great principle upon which assent has to be obtained or refused, and which do not lead to prolonged discussion, which would be impossible here. I hope my honourable friend will be satisfied with this explanation.

Mr. CHRISTOPHER MIDDLETON asked: Are there not points of very great difference involved in this question?

The CHAIRMAN replied: Undoubtedly there are points of very great importance indeed involved in this question, but they are points which the executive held could not be well discussed before so large a meeting as this. Many of them are extremely technical points, and points upon which there might be great difference of opinion, which might entail a very prolonged discussion. It was therefore thought that unless we were to have an adjourned meeting it would not be possible to deal with them.

Mr. CHRISTOPHER MIDDLETON said: I would ask that the opinion of this meeting be taken upon the point of principle, without going at all into details.

Mr. BOWEN-JONES said: On behalf of my colleagues in the Veterinary Section, after the statement your lordship has made, and the assurance given us that these matters will be fully considered upon some other occasion, and will be published, I wish to say I shall be fully satisfied if these Resolutions are withdrawn at the present moment.

The CHAIRMAN replied: I have to thank Mr. Bowen-Jones for his consideration to the meeting.

Dr. ALFRED HILLIER, as Honorary Secretary of the Reception Committee, then spoke as follows: My Lord, Ladies and Gentlemen,—I have the honour to report that the cordial hospitality extended to members during the Congress by a number of ladies, noblemen, and gentlemen in London has rendered the duties of the Reception Committee a most agreeable task.

I desire on behalf of the Reception Committee to express our sincere thanks to—

The EARL and COUNTESS OF DERBY.
The DUKE and DUCHESS OF NORTHUMBERLAND.
The LORD MAYOR OF LONDON.
Sir WHITTAKER ELLIS.

We are also indebted, for kindly receiving members at their houses, to—

The DUKE and DUCHESS OF WESTMINSTER.
Sir JAMES BLYTH.
Mr. ALFRED DE ROTHSCHILD.
Mr. ALFRED BEIT.

And to—

The DUKE OF SUTHERLAND, the EARL OF ELLESMERE, and Mr. JULIUS WERNHER, for allowing visitors to view their private art collections.

The reception and entertainment work of the Congress has received the most able and energetic support and assistance of the Ladies' Reception Committee. For the work of this committee the Congress is under a deep sense of obligation to its distinguished and gracious president, the Countess of Derby. The Congress is also much indebted to Miss Lankester, the honorary secretary, and to Lady Priestly, Lady Broadbent, Mrs. Malcolm Morris, and all the other ladies constituting that committee.

I take this opportunity to publicly thank the following clubs for kindly extending privileges to members of the Congress:—

The Junior Constitutional Club.
The National Liberal Club.
The German Athenæum.
The Ranelagh Club. (Cheers.)

Professor CLIFFORD ALLBUTT said: With your permission, sir, I should like to second the motion for the adoption of the Report which has just been read. Any person who has had any concern whatever in getting up any movement, especially in a very large town, still more in a great country, will know that certain individuals must be depended on who are both able and willing to take up a very great deal of laborious work, which even now, after that Report has been read, must in its greatest part remain entirely unknown to you, and I fear the only reward of those who have done it must be in their consciences. You have heard many names; it would be impossible for me, much as I should like it, and much as you would wish in a sense, to name in particular the work which has been done, but I think it would be very difficult for me to avoid making a definite allusion to Lord Derby for his personal interest in this matter. It would be quite consistent with Lord Derby's position, both outside and within this Congress, had he been satisfied to attend this meeting, with which he was officially concerned as Chairman. Lord Derby and Sir Herbert Maxwell, and others who do not belong to the medical profession, and have been able to bring great influence to bear on this occasion, have not been content with that; they have attended other committees and meetings with which they were not directly personally concerned. That is one of the many ways in which it has struck me, and I am sure struck everybody who has had anything to do with the work of this Congress, the singular devotion which has been given by our Chairman to this work—devotion which cannot have come from mere goodwill only, but from a very strong conviction of the immense importance of this work, and from a highly intelligent appreciation of the conditions under which it has had to be carried out. (Cheers.) I think, ladies and gentleman, his lordship will forgive me for singling out his name on the present occasion. He would, I know, wish me to add that this work has been seconded in a very remarkable way by many gentlemen, who, I believe, do not wish me to mention their names; but it would be very difficult for me to sit down without making at any rate a reference—a reference will be sufficient—to the Honorary

Secretary-General, Mr. Malcolm Morris. (Cheers.) I should like to say that I have taken it upon myself to make this reference to him—perhaps somewhat against his will—but I think you would feel I had not done my duty properly were I not to ask you to express a personal vote of thanks to him also on this occasion.

M. BROUARDEL: There rests with me the very agreeable duty of telling the members of the Executive Committee of the Congress, in the name of the foreign delegates, how great their success has been and their kindness to us. We shall always remember the reception we have received. The Committee have provided at all our places of meeting all possible means to render our stay agreeable. We have been much touched by these testimonies of friendship. I do not wish to dwell on the serious work of the Congress, to which, however, the Committee have so ardently devoted themselves and in which they have so plainly succeeded. Also, we—I speak for all those to whom I have spoken on the subject—will preserve a grateful remembrance of the Committee and its very friendly reception of us. Gentlemen, I trust that these friendships begun in London will not be forgotten, and I had much pleasure, at the first meeting, in inviting you, in the name of the President of the French Republic, to the next Congress on Tuberculosis to be held in Paris two or three years hence. I say two or three years, because my neighbour, the delegate from Spain, remarked that in two years a Congress of General Medicine will be held in Madrid, and two Congresses held at the same time might prove inconvenient. But there is one thing I am particularly anxious about, and that is that the Congress in Paris shall be a successful one, and I make so bold as to ask Lord Derby, the President who has so ably directed and governed the lengthy preparations for the Congress in London, if he will accept the office of President of a Committee of the Englishmen willing to participate in the Paris Congress. If Lord Derby will accept this task we shall be profoundly grateful to him, and I am sure that after the Congress in Paris our gratitude for his valuable and generous aid will be still more deep. Once more we offer our hearty thanks to the Committee, and can only repeat that we have been welcomed here in a manner which we shall never forget.

Professor Dr. GERHARDT, speaking in his own tongue, said: My Lord, Ladies and Gentlemen,—The allied Governments of the German Empire have, in answer to your kind invitation, sent two representatives here. Numbers of members of societies, as well as private doctors, inspired by the interest of the subject, have followed their example. You can see from that how great is the eagerness in our land to join the fight in this world-wide contest against this crushing disease of the human race. You can see from that how great is the sympathy for this Congress in our country. We doctors have landed on your coasts with a feeling of reverence and gratitude; we thought of Harvey's great discovery, on which stands the whole of the physiology of to-day, and of his specimens preserved with such care in the rooms of the Royal Society.

Was it not in Great Britain that murderous public pestilence was driven back, "as the wolf is by the hound," said Edward Jenner, after he made his first inoculation fifty years ago, and thereby reduced small-pox, then in the highest rank of epidemics, to the lowest rank. His inoculation was and is the model of all combating of epidemics by inoculation.

We thought, further, that Lord Lister alone is to be thanked for the power of modern surgery, which indeed is so powerful in the contest with external tuberculosis, for he has founded antisepsis, out of which asepsis developed. (Cheers.) We thought of the high position of the doctor's profession in your land, and of the hygienic habits and arrangements which have grown so strongly into your country, and to what you have already attained in the contest with tuberculosis.

Now we part from you with a feeling of thankfulness for what we nave learnt, for the many inducements to fresh work and fresh investigations. do not know how to thank you for the warm, lavish, heart-stirring hospitality which we have found here in your land. (Applause.) We can only do it by going away and spreading and carrying out in our lives the learning we have received here. (Here Professor Gerhardt continued in English.) We leave London hoping and believing that this third Congress on Tuberculosis, held under such auspicious circumstances in a country whose customs of life and institutions are so highly developed, may amply contribute to the public health of this rich and beautiful country, and that its success may be beneficial to the welfare of all the world, and that its memory should be a diamond in the crown of its high patron.

Mr. MALCOLM MORRIS, rising to return thanks, said: I am permitted, ladies and gentlemen, the great privilege of returning thanks on behalf of the Executive of this Congress, and in doing so as Secretary-General I should like to mention in a very few words the names of some of those who have been my most important lieutenants. In the first place, it would have been impossible to organise this Congress had we not had the co-operation and help of my friend Dr. StClair Thomson, the Honorary Foreign Secretary. (Cheers.) Immediately following I would mention Dr. Hillier, the Honorary Secretary of the Reception Committee. And now I would speak for one moment, if you will allow me, of the indefatigable and most remarkable work which has been done by Dr. Jobson Horne in preparing the Museum. (Cheers.) It is a labour which ought not to go without very marked recognition. Dr. Jobson Horne began seven or eight months ago to prepare for this Museum. I say that in the making of museums he is a master. He has done it before, but he has eclipsed himself on this particular occasion. As far back as last Christmas he went to Berlin, and he interviewed everybody there who had any specimen worth talking about in connection with tuberculosis, and he managed to extract from our friends in that city all the remarkable specimens you have been able to witness during the last few days. That alone was a very remarkable work. But since that time he has compiled—burning necessarily a very large amount of midnight oil in order to do it—the

very able, accurate, and most instructive catalogue which you have had the opportunity of possessing. (Cheers.) I must also express my thanks to Mr. Swithinbank and Mr. Cutler for all that they have done, and also to my friend Sir Arthur Trendell, without whose services much of the real value of this Congress would have been useless. I have also to thank, though I cannot mention them by name, a number of indefatigable ladies and gentlemen who have assisted me as clerks in the preparation of this Congress. Without their devotion and energy—especially that of the ladies—it would have been impossible to have coped with this very large undertaking. (Cheers.) Lastly, I have, as Secretary-General, to thank the distinguished nobleman who occupies the Chair. (Cheers.) It would have been a perfectly impossible task for a humble individual to have attempted to get up a large Congress of this character—in all questions where tact was required and where judgment was wanted—if I had not had the opportunity at all times and every day of consulting Lord Derby. (Cheers.) There has never been one single moment during the last fifteen months that I have had the smallest shadow of difficulty in obtaining Lord Derby's assistance. In all points of difficulty I have gone to him, and it is due in the main to his advice that this Congress has been the success which it has. (Cheers.) I may mention what may seem a trivial, but to me a very important matter. On three occasions I have entered Lord Derby's house at half-past eight in the morning; I have caught his lordship on his way to his breakfast, but I have left the house at half-past eleven or twelve, and he has never had his breakfast at all. (Cheers and laughter.) That a nobleman in his position would sacrifice his personal comforts, would give up his time, and assist in the work of this Congress—all that I have to say is, that it is a most remarkable and encouraging feature. (Cheers.) I wish in my last word to say that if anybody congratulates me, it must be remembered that the congratulations are due to all my coadjutors, who have been so loyal, faithful, and true in assisting me to carry out this work. (Loud cheers.)

The CHAIRMAN, in reply, said: I must ask you, first of all, ladies and gentlemen, to consider that the view which Mr. Malcolm Morris has been kind enough to take of my part of the performance has been seen under a very powerful magnifying glass. When he spoke of other matters I rather wondered at one moment whether he was going to indict me before the Anti-Tuberculosis Congress, and whether an occasional absence from breakfast was part of the infringement of the *régime*. (Laughter.) That not being so, I will only thank him and my other colleagues once more most sincerely, as we all do yourselves for your attendance. I now pass to that object for which I particularly desired to rise.

Lord Derby then addressed M. Brouardel as follows:—

"Je remercie, M. le professeur Brouardel, au nom du Congrès et au nom de mes collègues du Comité, des paroles gracieuses qu'il a bien voulu nous adresser, et de l'appréciation flatteuse qu'il a émise sur le Congrès de Londres.

"Nous acceptons sans hésitation l'aimable invitation qu'il nous a adressée de la part de M. le Président de la République française, et je le prie de lui donner l'assurance que la Section britannique fera son possible pour assurer la réussite du Congrès de Paris. Nous espérons avoir le bonheur de travailler encore ensemble à Paris dans la lutte contre la tuberculose."

Prolonged applause greeted the conclusion of the Earl's speech, and the audience dispersed, this being the termination of the business of the Congress.

BANQUET.

FRIDAY, JULY 26TH, 1901.

ON Friday evening a banquet was given in the Hotel Cecil in honour of the Foreign, Indian, and Colonial Vice-Presidents and Delegates. Nearly two hundred and fifty members sat down, and the Chair was taken by the RIGHT HONOURABLE THE EARL OF DERBY, K.G.

The first toast, "His Majesty the King," was proposed by the CHAIRMAN, who said: My Lords, my Lord Mayor, and Gentlemen,—I rise to propose the first toast, which is drunk alone, a custom which, I believe, is followed in all other countries. There is a special interest on this occasion attaching itself to the health of our Sovereign the King, because, but for the lamented event of a few months ago, we might have hoped to have him standing here as your President and giving to the Congress that personal attention, that warm support, that ever-ready assistance which, I am certain, His Majesty would have given on this occasion. (Cheers.) We have to speak of a King whom his country not only respects but loves—(cheers)—who commands not only the allegiance but the regard and the affection of his subjects; and he can claim for himself that he has, in a long course of years, made, not by the help of others, but for himself, that great position which he occupies amongst his countrymen. (Cheers.) I do not speak of the official position as monarch of this country and the Greater Britain beyond the seas, but I speak rather of one who, during his long period, as I may also call it, of probation as Prince of Wales, was the first in England to perceive how much good could be done by one ever ready to serve the interest of his fellow-countrymen wherever his presence was asked, and who, at great sacrifices often to himself, has never refused, on a reasonable occasion, to take part in that which interested his subjects, whether it were great local works, or whether it were special works of charity, or work such as this Congress. (Cheers.) Our constitution, as I daresay most gentlemen do not require to be told, does not allow the heir-apparent to the throne to take any active part in politics. He should keep himself on equal terms with all sides and all parties; and it is an especially difficult matter for one who had, I may say with all respect, arrived at middle life to have kept for all these years entirely clear of political entanglement, and to have devoted his energies to that good work which no one could challenge, but which could be approved. (Cheers.) The King, as Prince of Wales, was early in the field in seeing the importance of the great subject which has brought us all here together; and from the date he called the meeting at Marlborough House of those interested in such questions, now some three years ago, he assumed a position in respect to the question of tuberculosis which, I do not hesitate to say, has done more than almost anything else to

bring the question to prominence in this country. (Cheers.) I speak with the knowledge that although there were sanatoria in the country, establishments which could hold their own, I believe, even at the present time, still there was no general movement, no united campaign, to crush the enemy, not at one point, but all. That was the strength of this movement against tuberculosis; it enlisted on all hands those who were ready to help, whether by their knowledge, their authority, their means of helping others, or their ambition for performance in the field of science—it brought them together and solidified that which might have been the effort of united parties into the effort of one vast and united army; and I do not hesitate, standing here amongst men of science, to claim for our King that he has been foremost in this movement in this country. (Cheers.) I speak, of course, with all regard to those whose knowledge assisted him, who helped and guided him; but the moving spirit, the untiring genius at that moment was the King himself, and when the time comes for him to go down to his grave, honoured and respected, he will have no prouder claim to what he has done for his country than the efforts he has made in the cause of destroying this fell disease. (Cheers.) As loyal subjects and as loyal friends I know you will drink the health of our King with ample enthusiasm. (Cheers.) I wish it had been possible for him to be amongst us; but we know that almost his last utterances have been his sympathy with us and the hope that the great effort of the medical profession with regard to combating and overcoming the disease may be followed by other efforts in almost as deadly a field; and then I hope that we, working together, not as allies, but, let me say, as brethren in arms, may carry forward this war against disease, against ignorance, and against neglect, and assist our King in the great though peaceful triumph which tends alike to the honour, happiness, and prosperity of his kingdom, and, as we believe, to the advantage and health of the world. (Cheers.) I give you, upstanding if you please, the health of King Edward VII., the Patron of this Congress.

The toast was drunk with musical honours.

The CHAIRMAN then rose again and proposed the next toast in the following words: We drink the health of the Queen and the Royal Family next, gentlemen, separated but by a short interval from that of the Sovereign, but nevertheless a separate toast. Of Her Majesty the Queen, who can speak without reverence and respect? (Cheers.) There are countrymen of her own present who can say with pride, though not with astonishment, that Her Majesty, from the day she first came over to this country, carried away the hearts of her people as her forefathers had sometimes carried away their goods—(laughter)—and by a peaceful conquest brought this realm as completely under her sway as was compatible with the situation which she then occupied. As the consort of our Sovereign, under the special circumstances of the sad position and great grief which is cast for the time over the Royal Family, Her Majesty has not been able, any more than others, to take part in many of the more stirring events of public life, but it is noteworthy—

the reflection came to me this evening, and I have verified it since—that the two public occasions on which our Queen, as Queen, has made her appearance, have been in respect of ceremonies connected with the giving of medals to nurses who have served abroad, and to those who have obtained certificates of honour at home. (Cheers.) We can claim, therefore, that Her Majesty, no less than her Royal consort, has sympathy with the work in which this Congress is engaged. The Duke and Duchess of Cornwall are also named in this toast. The Duke and Duchess are engaged at this moment in that tour of the world which I believe the King, as Prince of Wales, was one of the first to originate, and which has now become, I had almost said, a fashionable amusement amongst the Sovereigns of Europe. With us it is a necessity, and pleasant necessity also, for Greater Britain has a right to be visited by those who are connected with the throne, so that when the Duke, in his turn, comes to the throne he may know that he is not speaking of those with whom he is not acquainted, but has that personal correspondence with them which we think should exist in a free country between the Sovereign and the people. We drink, in this country, the health of our Queen and Royal Family only second to that of the Sovereign. There are many speeches to follow, and without further preface I give you the health of Her Majesty Queen Alexandra, the Duke and Duchess of Cornwall, and the rest of the Royal Family. (Cheers.)

This toast was received with acclamation.

The Earl of Derby proposed next a toast to our foreign guests: My Lords and Gentlemen,—The toast which I have to propose now is one to which I am sure all Englishmen will do the greatest honour. I beg you to drink to the health of our foreign guests. (Loud cheers.) When we consider who those guests are, surely nothing is required to stimulate you in this matter, and for once let people see that the Englishman is not so cold as he is supposed to be. (Cheers.) To those who have come, at inconvenience to themselves possibly, and who have brought to this Congress the tribute of their knowledge, the result of their experiments, the help which they can afford by suggestion and by example to brethren of their profession, we worthily pay honour, and we are glad to think that this Congress is not representative of one but of many countries, and that it is a great international movement in which we can join with freedom and at the same time with a sense of comradeship and of support which must help on the movement in which we are all engaged. (Hear, hear.) We recognise, as we are bound to do in common candour, that we were somewhat behind in the race at first, that we had to borrow many of our ideas from foreign countries, that we had to copy much which was done, and that we had to try and emulate those undertakings which had been successful elsewhere. In sanatoria, in the arrangement of hospitals, in the separation of patients, in the separation of those who hardly come within the class of patients, we have learned, as we hope, many lessons, and from this Congress we trust that the combination of talent which has been brought together, with the friction as it were of the

various wits which have been brought round our council board, will produce that result to which we look forward, and that the conference in itself will not be barren, will not pass away like one of the things of the moment, but will leave behind it an abiding good. (Cheers.) When I look at the formidable list—formidable only in number—of the gentlemen whom I shall have to call upon in turn to answer for their respective countries, I see I must not take up your time; but this you will allow me to say on behalf of ourselves at home, that while we thank our foreign guests for having come to us, we are not satisfied only with that, but we would ask them, and we say it from our hearts as well as from our lips, to remember the cordial invitation we extend to them to come again. (Cheers.) We are cold perhaps—some say phlegmatic. Our "good-bye" conveys a wish for the future happiness and welfare to the individuals to whom we say it; but we must go to other countries, where emotions are better understood or better expressed, for the "au revoir" or "auf Wiedersehen" which we in our hearts desire to utter. We hope, gentlemen, that you who have come amongst us, who have honoured us with your presence and your counsels, will be tempted on some future occasion once more to cross the seas; and I am sure, on behalf of those who may succeed me in my office, I can say that you will on all occasions experience the same hearty and sincere welcome which we endeavour very humbly and imperfectly to give you at the present time. (Cheers.) I must not sit down without making, on behalf of our direction, their humble apologies for some of the shortcomings which may have taken place, both at our Congress and possibly to-night. My colleagues one and all have been fairly overpowered with work; and if everything has not been perfectly arranged, and has not gone like clockwork, you in the kindness of your hearts will overlook these matters, and know that the will was there, however imperfect has been the response. (Cheers.) And now, gentlemen, let me thank you once more on behalf, not only of ourselves, but of our country, and not only on behalf of our country, but on behalf of the world, for the magnificent array of men of distinction who accepted our offer and came to our councils and our board. It is indeed with a feeling of pride that I find myself addressing those whose names are household words, not only in Europe, but throughout the world. We see them gathered around us. We are able to look back to the time with pleasure when we have spoken to them face to face, and in our humility we hope that they, when they return home, will not altogether have forgotten us. We can only assure our foreign guests that we have tried to give them what our Transatlantic friends call a "good time," and we hope that they have been happy with us, that they will have a fortunate journey home, that they may there gather further honour, and that in time to come we may once again meet in the capital of our country, when I am bound that we will give them the heartiest reception possible. I wish them once more, on behalf of our Association and of my colleagues, all the good wishes which may attend the happiness of man.

This toast was enthusiastically received and drunk, the cheering being long and loud.

Professor E. G. JANEWAY, to whom the duty of returning thanks for the United States of America was entrusted, said: My Lords and Gentlemen,—It is a matter of regret to me on this occasion that I am not possessed of the wit of Senator Pugh, who is noted for his after-dinner speeches and the amusement they give, as well as the masterly manner in which he conveys the feelings which are in his heart. In the same way I lack that eloquence, which you know so well, of Mr. Choate, our ambassador—(cheers)—than whom perhaps none could be more eloquent or better express the feelings which we all have. Nevertheless, I will try to express myself for my colleagues with regard to those feelings which have come to us in connection with the meetings we have attended. We feel that we have learned a great deal; that the friction that has come from the presentation of views which have differed somewhat from those ordinarily expressed, like friction of every other kind, has been productive of light, and that that light will illumine and truth will prevail. What truth is may be for the time a matter of question, but that truth in the end will come out of it everyone must feel convinced. (Hear, hear.) I wish I were possessed of a greater magnetism, and a greater capacity of expressing rightly the views of my countrymen on this occasion. Previous to coming here, at the express request of several of my colleagues, I had drawn up in cold blood a series of statements, which should convey to you their feelings, which we had intended to present at the meeting this afternoon. But when I saw how orderly and pre-arranged that meeting was, I did not feel that I could intrude those expressions of our feelings at that time; so that the matter which was prepared for such an occasion may perhaps express to you our feelings better -being prepared in cold blood and not stimulated by the magnetism of meeting one's confrères, without the inspiration which comes from the convivial table—than any speech I could possibly make, and so if you will allow me I will read what I jotted down. "The American Vice-Presidents, delegates and members desire to express to the officers and members of the British Congress on Tuberculosis their great appreciation of that courteous, hospitable and generous treatment of which throughout the meetings, and in those social affairs which are outside the proper purview of the Congress, they have been the recipients. Moreover, they desire to express the assurance that the conduct of the meetings has been so orderly, so thoughtful, and in every way so beyond criticism, as to be for all concerned an object-lesson in the proper method of conducting assemblages of this kind. Further, it is their belief that great good in all lands will result from the deliberations and conclusions reached by this Congress." Allow us, then, in this manner to make to you our thanks and appreciation of the renewed zeal with which we will resume the conflict in our own country against the evil of tuberculosis. Rest assured that these are not idle vapourings, but mature convictions. We only wish we could, even in a small degree, reciprocate. It may be that the conviction that you have accomplished much for the common good of mankind may be your only reward outside the benefits which may accrue to your own countrymen, but memory will always give us pleasant thoughts of this visit to your shores. (Cheers.)

Professor L. R. VON SCHRÖTTER, Austria's representative, said: My Lords, Colleagues and Gentlemen,—Allow me to say that there is some resemblance between a congress and a marriage. Those who endeavour to undertake the one or the other cannot say how the affair will end. (Laughter.) The case is still more complicated when both parties are from different countries. In this meeting we have had the representatives of nearly all peoples, and one would not have wondered if there had been little troubles. But as in the best marriages there are little clouds which disappear, also here clouds disappear, and the sunshine again pours its beams over us all. We are working for the advancement of science and for the good of the whole community. (Cheers.) Allow me to tender you my best thanks, not only for the single country which I have the honour to represent, but in the name of thousands, of many thousands, of men who will profit by the benefits of this Congress. (Cheers.) I am proud that my prognostication at the first meeting of the Congress has been borne out in such an excellent way. Again I offer my best thanks to our hospitable friends in England, and not only to the gentlemen, but to the ladies—(cheers)—to the ladies who have allowed us to enter into their houses, and who have received us with hearty and noble hospitality. (Cheers.) Allow me to drink to them. (Loud cheers.)

Dr. GEORGE MARTIN, the representative of Belgium, said: My Lords and Gentlemen,—In the absence of Senator Montefiore Levi, the official delegate of the Belgian Government, who is prevented from being present at this banquet, I have the honour, in the name of my compatriots, to beg you, the President and the Members of the Committee of the Congress, to accept our heartiest and warmest thanks for the courtesy and generous hospitality which you have offered us.

The important speeches, the learned discussions to which we have listened in the different meetings of these memorable gatherings, will furnish fresh nourishment for our studies. They will exercise, without any doubt, a happy influence on the solution of the important social problem which the struggle against tuberculosis has put in the front rank in all countries.

Be assured that we shall keep an undying remembrance of the sympathetic and cordial reception which you have given us, and be graciously pleased to accept this expression of our profound gratitude.

Dr. MIKAILOVSKY, of Bulgaria, said: My Lords and Gentlemen,—I am gratified by the honour which has been done me in allowing me to say a word of thanks, but I consider myself too young to address such eminent men as we see before us. However, it is my duty to express to you this evening my most respectful gratitude on behalf of my Government for inviting so small a Government as Bulgaria to be represented, and asking a representative to attend this important Congress. Therefore I am very thankful on the part of Bulgaria. (Cheers.)

Professor B. BANG, representing Denmark, replied to the toast in the following words: On this occasion I deeply feel my lack of eloquence to express the feelings which animate me, but if my language is feeble my feelings are not, and it is from my whole heart that I wish, as the representative of one of the smallest nations, to express our sincerest thanks for the memorable week we have been happy enough to pass here. For all that we have learned, for all that we have seen, for all the impulses given to us, for all the kindness shown to us—I venture to say, for the friendship offered to us—we are very thankful. (Cheers.) There can be no doubt about the results of such a Congress as this, and it seems to me that it has contributed to strengthen the feeling of the brotherhood of nations—(cheers)—uniting us all in the struggle against our common enemy, a feeling which is the only sure basis for the existence of small nations like ours. With these few words I give you our most heartfelt thanks. (Cheers.)

M. FÉLIX VOISIN replied for France thus: The great honour which has been done me in asking me to speak in the name of my country, France, places upon me the duty of first presenting to you, in the name of all my compatriots, our most heartfelt thanks, to the organisers of this splendid Congress, and particularly to Lord Derby. He has received us with a graciousness without parallel, and we shall carry away with us to our respective countries sentiments of profound thankfulness which it is impossible for me to properly express. It is not by words that France is able to thank the organisers of the Congress, it is by acts; and since you have kindly accepted the invitation of the President of the French Republic, I am happy to be able to say to you, not good-bye, but *au revoir*, hoping to meet you all in two years from now. After reading all the works that have been published, and listening to all that has been said so well and so truthfully at the Congress, the French people will consider it a duty to walk in the steps both of the Congress of Berlin and that of London. France will never forget the illustrious Lord Lister, of England, Professor Koch, of Germany, and Dr. Pasteur, of her own country. I believe I am only expressing the idea which is in the minds of us all in saying that it is impossible in this struggle undertaken against tuberculosis to rest until we have achieved a complete victory. (Cheers.) No, gentlemen, we shall not rest; and I believe that but few years separate us from the time when we shall be able to say that the monster has been vanquished, to the great good of the whole of humanity. Therefore, gentlemen, I ask you to come to France when the next Congress is held two years hence, and we shall then be able to show you all that we have done, following in your footsteps, and God grant that we shall be able to carry on the admirable work which you have already begun, to the great benefit of science and the greater good of humanity. (Cheers.)

Professor Dr. GERHARDT, from Berlin, replied to the toast on behalf of Germany in his own language, saying: My Lords and Gentlemen,—Permit me on behalf of my countrymen who are gathered here—and I do not doubt

their entire approbation—to express full recognition and hearty thanks for the splendid organisation of the Congress, which will be such a good example for us in the future; for their kind invitation to take part in this important work, for the benevolence, the goodness, and—I may well use the expression—for the heartiness with which we have been received here, and for the friendly cordiality which we have met with. Allow me for one moment to glance back over our Congresses. The first, as it happens with sons in a family, was the darling of his parents, and was brought up with care and pains, and became, I think I may well say, a brave and splendid youth. (Cheers.) The second generally turns out to be a merrier, brighter, more spirited boy. What becomes of the third one cannot prophesy so clearly; sometimes he grows right over the heads of the others, and in this case this would be quite likely. The next Congress can draw upon the experiences of the usefulness of the others, for it is to become a bigger, more dazzling, and, I might even say, a more successful one than all the others. It has—which is so rare—while yet in bud, borne fruit, fruit which will come to much good. It has brought forward great questions and afforded food for thought in the future. We hope that the next Congresses, perhaps the very next one, will bring us the solution of these questions, from which we may hope for a definite result. (Cheers.) This is how everything finally turns out with our Congress. For this the mild climate of England, this happy island kingdom, in which, it is true, grapes do not ripen—which is perhaps an inducement for anti-alcoholism—but in which the palm winters in the open; and the palm in the tuberculosis struggle my honoured colleague, M. Brouardel, and we all with him, I think, have allotted to our British friends. They have up till now worked most at this question. So we shall return full of the deepest impressions; we shall think of the words of our poet—

> "Wohl vom grossern Regen mag es rauschen,
> Wo vier Welten ihre Schätze tauschen."

We return filled with a great impression of the magnificent hospitality which we have received here from the united efforts of not only so many noted doctors, but also of men of high position who have stepped down and worked with them, who, as one might poetically say, have wept the tears of poverty from their inmost souls. (Cheers.) I may well say that care for the poor, the sick, the ageing working-man is what we must strive after, and which has, if I may without vanity say it, been very much helped on in Germany, for we have founded sanatoria for them all over the country. (Cheers.) To produce that is certainly a noble task, for which we have to thank those who have organised it, and so I beg my German countrymen to raise their glasses and drink to the success of this third Congress, to the effective organisation which has directed with such a gentle hand, to the goodwill which the organisation has shown to us, and above everything else to him on whom all our thanks to the Congress are concentrated, to the honoured President of the Congress; three cheers for him, hoch! hoch!

This speech was followed by loud applause.

Professor PEL, of Holland, said: In responding for Holland I will ask you to accept from myself and my colleagues our hearty thanks for the reception you have given us. Wherever we have come from, France, Germany, Italy, Spain, or any of the other countries of Europe, we have come with the firm intention of lessening the suffering of humanity by endeavouring to stamp out this fell disease. Gentlemen, I ask you to drink to the prosperity of medical science. (Cheers.)

Dr. REIS, of Hungary, said: Permit me, my lords and gentlemen, to speak on behalf of the Hungarian delegates, to express our thanks towards you and towards the officials of the Congress and the Executive Committee. I shall simply confine myself to one or two words in testifying the thanks of Hungary to you all for the manner in which we have been received. Those words are full of gratitude, and express our most fervent wishes for the happiness and prosperity of your country, of the great Metropolis, and for the glory of the grand nation, Great Britain. (Cheers.)

Professor CERVELLO, of Palermo, speaking (in his own tongue) for Italy, said: Gentlemen,—I have been invited to speak now, and I do so very willingly, in spite of many worthy friends who have to speak. But I accept very willingly because it affords me a happy opportunity for publicly manifesting my gratitude for the reception which has been afforded to us Italians in this country, so eminently hospitable.

For my part I live far away from you, in the furthest confines of Italy, in Sicily, whither I shall carry a remembrance of this cordial hospitality, and still more of grateful love for it.

In fact this dreadful disease which is called tuberculosis, the worst of the diseases which afflict mankind, has given an occasion for all the civilised world to collect, and to estimate and recognise its force.

On the other hand, we have come together with the pleasing generous intent to try and strike a blow to mitigate the horror of this misery of consumption.

We again find our progress truly often spoiled by that public egoism which for so long a time has shown an indifference to, or contempt for, this social misery.

Let praise then be given to this deserving Committee, who have worked with the certain crown of an ultimate success; let praise be given to this country, which in point of benevolence offers so much noble example. (Here the speaker continued in English.) My Lord and Gentlemen,—To the continued success of British medical science, and to the continuance of the strong friendship existing between England and Italy. (Cheers.)

Professor MALM, speaking for Norway, said: My Lords and Gentlemen, —As the representative for Norway, I have the honour to speak to you on behalf of my country. I thank you for the reception we have received, and I am very happy to inform you that my Government take the greatest interest

in, and have the greatest sympathy with, the objects of this Congress. (Cheers.)

Dr. DE LANCASTRE, of Portugal, said: My Lords and Gentlemen,—Up to the present, in our struggle against tuberculosis, the sole remedy has been resigning oneself to the inevitable. The loss occasioned by the disease has been exceedingly great; but all we have been able to do, up to the present, has been to pass the figures over to the statistician for registration in the statistics. Now, however, medical science has shown that the malady is curable, and societies have been formed, and Government measures brought forward, to initiate a struggle against an enemy hitherto believed unconquerable. The whole world is now interested in the struggle; and in this Congress rules have been laid down which must undoubtedly be of great service in destroying the prevalence of tuberculosis. The great results which will follow, Portugal will equally share in, and for that reason I, in the name of my Government and of the august lady who has taken such a deep interest in the work of the League formed in my country, the Queen, thank you for the friendly manner in which we have been received. (Cheers).

Dr. J. CANTACUZIÈNO, responding for Roumania, said: In the name of the Roumanian Government, which has done me the honour to appoint me a delegate here to assist in the work of the Congress, I have to thank the organisers and the Committee for the hospitality which they have so courteously offered to us. I wish to make myself the interpreter of the sentiments of my colleagues, and express to you our profound admiration for the results obtained in the last half-century in England in the struggle against tuberculosis. Those results are for us a lesson and an encouragement. As a delegate from Roumania, I drink to the illustrious men of science of England, and in particular to Lord Lister. (Cheers.)

Señor Don JOSÉ VERDES MONTENEGRO, of Spain, said: My Lords and Gentlemen,—As a representative of Spain I beg to tender you our most hearty thanks for your hospitality. We who represent Spain at this Congress shall return to our country determined to do all we can to propagate in Spain the results which have been arrived at for the prevention of tuberculosis. Gentlemen, I once more thank you for the reception you have accorded to us. (Cheers.)

Dr. KLAS LINROTH, of Sweden, said: Gentlemen,—On behalf of my country I beg to thank you for everything we have received and everything we have learned during the never-to-be-forgotten Congress, the results of which will be seen, I am sure, all over the world. (Cheers.)

Dr. SECRETAN, of Switzerland, said: I have to present to you, gentlemen, the thanks and recognition of Switzerland. We knew that in coming to London we should receive a warm reception, a generous hospitality,

and be made acquainted with the greatest treasures of art and science. Our expectations have not been deceived. It was a great surprise to us when we arrived in London on Sunday to find ourselves in a climate very much resembling that of Switzerland; the bright rays of the sun recalled to us our lakes and our mountains, and agreeably brought to our recollection the remembrance of our country. Switzerland has brought into the struggle against tuberculosis other things besides the beauty of Nature and the pure air of its mountains. We shall continue on our way and do all in our power to bring about the final success in the struggle of which this Congress marks so advanced a stage. In the name of the Swiss delegates I thank the organisers of the Congress for the distinguished manner in which we have been received. (Cheers.)

In the absence of Sir James Crichton-Browne, the toast of "Greater Britain" was proposed by Sir HERBERT MAXWELL, who said: My Lords, Ladies and Gentlemen,—I am afraid it must be a great disappointment to those who are acquainted with the inimitable talent of Sir James Crichton-Browne, that this great toast should be entrusted to my hands in his absence. I cannot emulate that talent, for Sir James has, in a peculiar degree, the art of clothing lofty thoughts in eloquent words; but I trust the nature of the toast itself will provide the eloquence that is absent from my speech. It is the toast of our kinsmen, our brethren beyond the seas, those who unite in forming what we term Greater Britain. (Cheers.) Gentlemen, the ties which unite the mother-country with her Colonies are many and varied and strong. Let us hope to-day that to the ties of natural affection, of historic association, and of common interest has been added a new and fresh and stronger tie, that of the desire to serve the common cause of humanity. (Cheers.) The Colonies are worthily represented here: the Colonies have sent many delegates. The Dominion of Canada and Australia are represented, and I think we are entitled to offer them and their representatives special congratulations, because this afternoon there was introduced into the Legislature a measure for altering the King's title, in recognition of the splendid service which has been rendered by our Colonies to the mother-country. (Loud cheers.) I will not detain you longer, but only ask you to unite by charging your glasses in bumpers and drinking to those vast dominions beyond the seas, to our people who populate them. I ask you to drink the toast of "Greater Britain."

This toast was then drunk with acclamation.

Surgeon-General HARVEY, speaking for India, first replied to this toast, saying: Lord Derby, my Lords and Gentlemen,—As a representative of India, which, though perhaps not in one sense Britannic, is still the brightest jewel in the British Crown, I can only at this late hour of the evening express for myself and for my colleagues, representing various provinces of India, our best thanks to the organisers of the Congress for the magnificent hospitality which they have extended to us to-night, and for all their kindness to us

during the Congress. I am quite sure we shall all of us take away the most pleasant recollections, and I am certain that we have learned a great deal which will be of great advantage to us in the future, and not only to us, but to the community at large. (Cheers.)

The CHAIRMAN here interposed and said: Before Sir David Tennant rises to reply, I wish to say that I have had a telegram from Lord Strathcona who, notwithstanding his many occupations, had intended to be with us to-night. In his absence I have much pleasure in calling upon Sir David Tennant.

Sir DAVID TENNANT then replied to the toast, saying: My Lords and Gentlemen,—I beg to offer on behalf of Greater Britain, which includes the self-governing Colonies and the Dominion of Canada, their thanks for the very handsome manner in which the societies of the civilised world have recognised us. We are indebted to science for all the great and important benefits we enjoy at the present day, and we feel that without the knowledge—which can be imparted only through those fully equipped to impart it—we could not survive the many disastrous inflictions which human nature is subject to. We have in South Africa, in a temperate zone, a climate of unsurpassed beauty, a climate which resists tuberculosis, and which, when taken at the proper time, will extinguish all symptoms of consumption. I speak from knowledge which I have acquired, and therefore I say that this Congress is doing a vast amount of good to humanity at large, and we, as colonists, desire to express our thanks for the efforts that have been made in advancing the interests of mankind. (Loud cheers.) And Greater Britain, in the next place, wishes to put on record its conviction that, forming one indissoluble whole of the Empire at large, as in the past so in the future, it will manifest that adhesion to principles which are powerful in this country, which pervade all sections of the community who are loyal to the throne, and which will ever inaugurate a system congenial to the advancement and prosperity of the people at large. On behalf of Greater Britain, so far as I am concerned, I beg to tender you my heartiest thanks. (Loud cheers.)

Sir JOHN A. COCKBURN also returned thanks on behalf of the Colonies: My Lords and Gentlemen,—The representatives from the Colonies are very proud of the welcome which always awaits them when they visit the mother-country. The component parts of Great Britain are bound to one another and to the mother-country by the strongest ties of filial and sisterly affection, and we regard it as a great privilege to have met so many distinguished strangers here whose names have for long been as household words throughout the whole of Greater Britain. (Cheers.) It is said that no nation can live for itself alone; and there is nothing which gives greater promise for the tranquillity of the world than the manner in which all nations have joined together in unanimity for one common purpose, namely, the general welfare of mankind. (Loud cheers.) Nothing cements friendship like warfare against the common foe, and the tubercle bacillus has at least this

merit, that it has made of one mind all the nations of the earth. (Cheers.) It is a great satisfaction that the modern methods of prophylaxis and treatment of tuberculosis marked out a course which is identical with the high-road which leads to general health. Pure meat and pure milk do not benefit any one disease, and the gospel of fresh air and sunshine is indeed of universal application. (Cheers.) We shall carry away with us this badge, which so artistically portrays the advantages of fresh air, sunlight and altitude in the treatment of this the greatest of our foes, as a memento of one of the most pleasurable and profitable gatherings it has ever fallen to the lot of colonists to be associated with. (Loud cheers.) I thank you very heartily. (Cheers.)

Sir WILLIAM CHURCH, Bart., then proposed the health of the Chairman: My Lords and Gentlemen,—The toast which I have the privilege to bring forward is one which fortunately needs no words of mine to render it acceptable, but I consider it a very great honour paid to my profession that I have been selected to bring it forward in the presence of so many distinguished guests. The Earl of Derby has many claims to our gratitude and respect for the parts that he has played in the government of the country and its dependencies, and in our civic and political life. (Cheers.) The services that he has rendered to the Congress are also to be added to those which he has hitherto given to the country. (Cheers.) How admirably he has presided over the Congress, and over this most magnificent banquet, you all are aware. (Hear, hear.) But you are not all equally aware of the debt which the Congress owes him. Since he undertook the presidency of our Organising Committee and Council his services have been invaluable. (Cheers.) He has used his influence, he has used his generosity, he has used his knowledge of men and matters in the interests of this Congress. (Cheers.) Now, I think it is a most fortunate circumstance, and one we must congratulate ourselves upon, that men like Lord Derby, Lord Spencer, Mr. Chaplin, and a number of other practical politicians, have joined themselves to our Association for combating tuberculosis. (Cheers.) It is not to the profession, but it is to the Government and upon the general public, that we must look for further progress in combating the disease. We have made an auspicious inauguration; it is upon the action of the general public and of our Government that we must look for the continuation and success of the movement. (Hear, hear.) We are grateful to Lord Derby for what he has done for us, and we are grateful in this sense, that we look to him for still further benefits and favours; and I am sure that I am only expressing the feeling of all here present when I say that we hope that he may live long to serve his country —(cheers)—and that his name may become as famous in the history of hygiene and public health as that of his ancestors in the political life of our land. (Cheers.) I give you the health of our Chairman.

The toast was drunk with acclamation.

The CHAIRMAN, in responding, said: Sir William Church, my Lords and Gentlemen,—At this late period of the evening I will not venture to occupy

your time more than a few minutes. Let me, in the first instance, say to you how truly and deeply I value these tokens of your kindness, and how little I feel that I deserve the encomia which were passed upon me out of the goodness of your heart by Sir William Church in speaking of anything I have done. But I feel that in drinking the health of your Chairman you do so, not in his own person, but as recognising that which has been the organising section, if I may so use the word, of this Congress. The work which has been done by my colleagues is great, has been continuous, and at no time very light. We felt, as the servant of the prophet was told in former days, that when the preparations of the Congress had already advanced, it was as if one had come to us and said, "Knowest thou that thy master will be taken from thy head this day." We lost the Prince of Wales as our guide and director; and if, as his humble lieutenant and devoted follower, I have been able to assist my colleagues, either as intermediary or in any other way, I can only consider myself fortunate in that circumstances have thrown me in constant contact with a body of colleagues whom to know is to admire, and to admire is to love. (Cheers.) They would not wish I should say more of them in detail except this, that when the Prince was taken from us we made up our minds that that in which he had shown so great an interest should not suffer, if any strength was left in us, by his absence from unforeseen causes. We were determined that this Congress should be organised on such lines as not only to be a pleasant meeting, but to do good. My kind friend, if he will allow me to call him so, Professor von Gerhardt, very nearly took not only my paper, but my little ewe lamb, which I was going to ask your attention to to-night. It arises out of the questions which were interesting us this afternoon. Something was said of the hospitals, of the desirability of sanatoria for the poor, and for the suppression at earlier stages of the disease. I was in the Chair, and it was not my business to speak, but I ventured to ask one of my friends, Dr. Nathan Raw, of Liverpool, who has worked ably and nobly in this good cause, and who, by his diplomatic genius, has brought into line some of our authorities and got them to take common action—(cheers)—to verify my statement. We hope in Lancashire that whatever we may be, we are practical; and I claim for my county that it has worked in the cause as well as talked. Dr. Niven, of Manchester, was able to tell you at an earlier period of the day some of the steps that have been practically taken in the disinfection of places from which patients have been removed. That was good in its way; but Liverpool has an equally good tale to tell. I asked Dr. Raw to verify my statement by a reference, and this is what he tells me. That common action had been established there I knew, and he gives me this information, which I commend to all, as showing that we can work as well as talk. The three Poor-law Unions of Liverpool have united to form a Tuberculosis Committee, and are erecting a large sanatorium for the treatment of consumption amongst the very poor. That meets one point. Another large sanatorium has been erected in Liverpool for the working classes other than the very poor. That meets another point. The outdoor relief is only granted in Liverpool on condition that the poor consumptives will consent

to be lodged in rooms suitable for the disease, and money is given by their guardians under their bye-laws for the segregation of patients at their own homes, I believe. I hope you will see that we are working, and not only talking. (Cheers.) I do not want to put my county before others. I know that good has been done, possibly more good even than that to which we can lay claim; but I speak of that which I know. I hope at the next Congress we may meet under the possible presidency of M. Brouardel, or some of his compatriots, and that we may have an equally good account, or an account of increased good which has been done in England since the last Congress and the Congress preceding it; that we shall take lessons from our friends, and that we all, as brethren in arms, as comrades in the great cause, shall be able to profit as in other matters by the latest improvements which science can give us, and that we may, as has been admirably said, join in one unbroken line to resist and to defeat the common foe of us all. (Cheers.) Now I can only thank you, gentlemen, as I have done before, for the personal kindness which you have shown to the Chairman and to the officials, and especially I could not omit from the names of those officials the names of many who have worked hard and worked well; but specially I would mention the name of Mr. Malcolm Morris—(cheers)—and Dr. StClair Thomson—(cheers)—than whom no one could wish to have two truer friends or better comrades standing at his right hand and at his left. (Cheers.) To them and to my other colleagues your thanks are really due. The Chairman is but the spokesman of the moment. They have done the work; and I trust that the approval which you have been good enough to give to them, concentrated in my person, will be esteemed by them as greatly as it is by the humble person who, in the character of your President, begs to return you his most sincere thanks for your kindness, and his heartiest and most sincere desire for your good health. (Loud cheers.)

We have an old-fashioned toast in the North that sometimes, when it is the close of the evening, we drink to our next merry meeting. Gentlemen, I give you the toast of "Our next merry meeting," and may it be a happy one.

This speech caused loud and prolonged cheering, after which the assembly soon broke up, and the Congress with all its functions, both serious and social, with one exception, was over.

LIST OF BRITISH DELEGATES.

ABBOTT, Councillor, Corporation of Tunbridge Wells.
ABBOTT, T. C., Manchester and Salford Sanitary Association.
ABRAM, G. S., M.B., Reading Corporation.
ABSON, J. S., F.R.C.V.S., Lancashire Veterinary Medical Association.
ADCOCK, Alderman J., J.P., East Kent Joint Committee for Appointing Medical Officers of Health.
AITKEN, JOHN, Junr., Scottish Metropolitan Veterinary Medical Society.
ALDERSON, F. H., M.B., Metropolitan Borough of Kensington.
ALDRIDGE, Councillor, Metropolitan Borough of Holborn.
ALEXANDER, FRED. W., M.O.H., Metropolitan Borough of Poplar.
ALEXANDER, HUGH, Metropolitan Borough of Shoreditch.
ALEXANDER, REGINALD G., M.D., J.P., Royal Infirmary, Halifax.
ALLAN, F. J., M.D., Westminster City Council.
ALLBUTT, Prof. CLIFFORD, M.D., F.R.S., Cambridge University; and Cambridge Medical Society.
ALLDAY, JAMES, Birmingham Butchers' Trade and Benevolent Association.
ALLEN, Councillor, Borough of Southend-on-Sea.
ALLISON, T. M., M.D., Clinical Society of Newcastle-on-Tyne.
AMBLER, Councillor FRANCIS, Leeds Corporation.
ANDERSON, Councillor Prof., M.D., University of Glasgow.
ANDERSON, A. JASPER, M.D., M.O.H., Blackpool Corporation.
ANDERSON, Bailie W. F., Corporation of Glasgow (Police Department).
ANDREW, JAMES, M.D., Royal College of Physicians, Edinburgh.
ANDREWS, E. COLLINGWOOD, M.D., Hampstead Corporation.
ANNIS, ERNEST G., M.O.H., Greenwich Corporation.
ARMITAGE, A., Nottingham and District Butchers' Association.
ARMSTRONG, Dr. H. E., M.O.H., Newcastle-on-Tyne Corporation.
ARRAS, WALTER, Ross and Cromarty County Council.
ARROL, Bailie A. T., Borough of Alloa.
ASHBY, ALFRED, M.B., F.R.C.S., M.O.H., Reading and Upper Thames Branch of British Medical Association and Reading Town Council.
ASHCROFT, W., British Dairy Farmers' Association.
ATKINSON, Councillor, Saffron Walden County Borough.
AVERN, Councillor E., Fulham Metropolitan Borough.
AXE, Professor J. WORTLEY, British Dairy Farmers' Association.

BABER, E. CRESWELL, M.B., Laryngological Society, London.
BACON, Ald. Sir HICKMAN B., Bart., Lincolnshire (Lindsey) County Council.
BAGNALL, W. G., Stafford County Council.
BAKER, Capt. R. L., Greenwich Metropolitan Borough.
BARLOW, Dr. W. N., M.O.H., Bootle Corporation.
BARNARD, Rt. Hon. Lord, D.L., J.P., Society for the Prevention and Cure of Consumption in the County of Durham.
BARNES, W. J., J.P., Dover Corporation.
BARR, JAMES, M.D., British Medical Association.
BARRATT, Dr., Corporation of Birmingham.
BARTLETT, Alderman, Durham County Council.
BARWISE, SIDNEY, M.D., M.O.H., Derby County Council.
BATY, Councillor J. A., Corporation of Newcastle-on-Tyne.
BAXTER, J. A., Dundee Corporation.
BAXTER, Bailie THOMAS, Greenock Corporation.
BEACH, FLETCHER, M.B. (President), Medico-Psychological Association.
BEACH, W. F. HICKS, Cotswold Sanatorium.
BEALE, Dr. E. CLIFFORD, Laryngological Society of London.
BEATTIE, Alderman R., M.D., Dewsbury Corporation.

BEATTIE, THOS., M.D., Clinical Society of Newcastle.
BECKETT, Alderman JAMES (Mayor), Corporation of Lowestoft.
BELLAMY, Dr. J. Henry, Sheffield Board of Guardians.
BENNETT, Councillor JOHN W., Greenock Corporation.
BENNETT, Dr. JAMES EDWARD, Otley Urban District Council.
BERRY, Mrs. DICKENSON, M.D., Childhood Society.
BERRY, WM., F.R.C.S., Corporation of Wigan.
BEST, Councillor Dr., Corporation of Dover.
BEVAN, THOS., Hospital Saturday Fund.
BIGGS, Councillor, Leicester Corporation.
BILLYEALD, J., Nottinghamshire Association for the Prevention of Consumption.
BIRD, J. B., M.D., Cumberland Branch of Association for the Prevention of Consumption.
BISHOP, Councillor ABEDNEGO (Mayor), West Ham County Borough.
BLACKBURN, Alderman JOHN (Mayor), Batley Borough.
BLAKER, Councillor, Brighton Corporation.
BLAKESLEY, T. HOLMES, Mercers' Company.
BLAKEWAY, JOHN, F.R.C.V.S., Midland Counties Veterinary Medical Association.
BLAKEY, Councillor WALTER, Corporation of York.
BLIGH, Councillor, Liverpool Corporation.
BLOYCE, W. H., F.R.C.V.S., Devon and Cornwall Branch of the National Association for the Prevention of Consumption.
BLUMER, F. MILNES, B.A., M.D., Staffordshire Branch of the British Medical Association.
BLYTH, A. WYNTER, M.O.H., Sanitary Institute.
BOND, P. C., M.R.C.V.S., Western Counties Veterinary Association.
BOND, Dr. W. ARTHUR, M.O.H., Metropolitan Borough, Holborn.
BOOBBYER, Dr. PHILIP, M.O.H., Corporation of Nottingham.
BOOTH, Alderman, National Federation of Meat Traders Association.
BORDER, Alderman SAMUEL, J.P., Corporation of York.
BOSCAWEN, Hon. J. R., Cornwall County Council.
BOWEN-JONES, J., F.R.C.V.S., Salop County Council.
BOWLAN, M. M., Guardians of the Poor, St. George's-in-the-East.
BOYCE, Professor R., Victoria University, Manchester; and University College, Liverpool.
BOYD, Dr. JOHN J., South Shields Borough Council.
BRABROOK, E. W., C.B., Royal Statistical Society.
BRADFORD, R., F.R.S., M.D., F.R.C.S., Jenner Institute of Preventive Medicine.
BRADLEY, Professor, M.R.C.V.S., National Veterinary Association.
BRADSHAW, Surgeon-General, C.B., M.A., Oxford Corporation.
BRAND, Rear-Adm. The Hon. J., East Sussex County Council.
BRECHIN, Councillor, Corporation of Glasgow (Police Department).
BRECHIN, MATTHEW, Glasgow United Fleshers' Society.
BRETTELL, H. C., Dudley Corporation.
BRINDLEY, A. E., M.D., M.O.H., Bury Corporation.
BROADBENT, Councillor B., M.A., County Borough, Huddersfield.
BROCK, WILLIAM J., M.B., F.R.S.E., M.O.H., Linlithgow County Council.
BROWN, Councillor GEORGE, Metropolitan Borough of Islington.
BROWN, Councillor, Greenock Corporation.
BROWN, Dr. BURTON, C.I.E., Apothecaries' Society.
BROWN, Dr. F. GORDON BURTON, Apothecaries' Company of London.
BROWN, Sir GEORGE, Bath and West and Southern Counties Society.
BROWN, Dr. RICHARD KING, Bermondsey Metropolitan Borough.
BROWNE, Dr. J. WALTER, Association of British Medical Officers.
BROWNE, J. ARTHUR, B.A., M.B., Metropolitan Provident Medical Association.
BROWNING, Dr. B., Southern Branch of the Incorporated Society of Medical Officers of Health.
BRUCE, Dr. WM., M.O.H., Ross and Cromarty County Council.
BRYAN, Councillor F. A., M.A., Metropolitan Borough of Southwark.
BRYDEN, R. A., Orphan Homes of Scotland and Sanatoria.
BRYETT, LEWIS T. FRAYER, M.D., M.O.H., Metropolitan Borough of Shoreditch.
BUCHANAN, Dr. R. M., Anderson's College Medical School.
BUND, T. W., Worcestershire County Council.

BUNN, W. G., Hospital Saturday Fund.
BURRELL, WM., Anderson's College Medical School.
BUSHNELL, F., M.D., D.P.H., Southern Branch of the National Association for the Prevention of Consumption; and South-Western Branch of the British Medical Association.
BUSZARD, Councillor F., F.R.C.S., Corporation of Northampton.
BUTTERS, ALEXANDER L., Central Veterinary Medical Society.

CAHILL, J. Z., Poplar and Stepney Sick Asylum District Association.
CAIN, Alderman, Corporation of Bootle.
CALLAGHAN, Councillor Dr., Corporation of Coventry.
CAMERON, Sir CHAS. A., C.B., M.D., M.O.H., Royal College of Surgeons, Ireland; and Corporation of Dublin.
CAMERON, Dr. JAMES S., Leeds Corporation.
CAMERON, JOHN, M.R.C.V.S., Corporation of Berwick-on-Tweed.
CAMERON, KENNETH, Aberdeen Town Council.
CAMPBELL, Councillor, M.D., Kesteven County Council.
CAMPBELL, A. J., M.D., J.P., British Postal Medical Officers' Association.
CAMPBELL, Dr. H. J., Bradford Branch of the National Association for the Prevention of Consumption.
CANCELLOR, B. D., Corporation of Winchester.
CANNEY, Councillor Rev. EDWARD, Metropolitan Borough of Holborn.
CARTER, GEO. W., F.R.C.V.S., Keighley Corporation.
CARTER, J. BONHAM, Winchester and District Branch of the National Association for the Prevention of Consumption.
CARTER, Dr. R. J., Borough of St. Marylebone.
CARTER, Professor W., M.D., LL.B., University College, Liverpool.
CATON, Professor RICHARD, M.D., F.R.C.P., University College, Liverpool.
CATTLE, Dr. C. H., Nottinghamshire Medical Chirurgical Society.
CHALMERS, Dr., M.O.H., Corporation of Glasgow.
CHAPMAN, A., Ancient Order of Foresters.
CHAPMAN, Councillor L.P., Corporation of Barrow-in-Furness.
CHAPMAN, PAUL M., M.D., Hereford Branch of British Medical Association.
CHEETHAM, WALTER H., M.D., M.O.H., North Riding (Northallerton) County Council.
CHEYNE, W. WATSON, F.R.S., F.R.C.S., Pathological Society.
CHIENE, JOHN, M.B., Royal College of Surgeons, Edinburgh.
CHISHOLM, SAMUEL, Lord Lieutenant and Lord Provost, Police Department of Glasgow.
CHOWN, J. C., Battersea Metropolitan Borough.
CLARE, J., M.O.H., Hanley County Borough.
CLARK, RICHARD, Edinburgh Parish Council.
CLARKE, Sir ERNEST, Royal Agricultural Society of England.
CLARKE, J. MICHELL, M.A., M.D., University College, Bristol.
CLARKE, R. W., M.R.C.V.S., Lincolnshire Veterinary Medical Association.
CLARKSON, J., M.R.C.V.S., Yorkshire Veterinary Medical Society.
CLEASE, R. S., Shrewsbury County Council.
COATES, Dr. HAROLD, Manchester Corporation.
COE, Alderman, J.P., Halifax Corporation.
COGAN, Dr. L. F., M.O.H., Northampton Corporation.
COGGAN, W., National Federation of Meat Traders Association (Incorporated).
COLLIER, WILLIAM, M.D., Oxford Corporation.
COLLINGRIDGE, WILLIAM, M.D., London Corporation.
COLLINS, H. H., Paddington Metropolitan Borough.
COLLINS, J. W., M.D., F.R.C.S., London County Council.
COOK, G. G., Thanet Rural District Council.
COOK, THOMAS (Mayor), Birkenhead Corporation.
COOK, Alderman W., J.P., Birmingham Corporation.
COOKSON, Alderman EDWARD H., Liverpool Corporation.
COOPER, Alderman J. H., Gravesend Town Council.
COOPER, WILLIAM, London Chamber of Commerce.

COSTER, Mrs., Royal British Nurses' Association.
COTMAN, Dr. J. S. E., London Corporation.
CRAIG, JAMES, M.D., Royal College of Physicians, Ireland.
CRITCHETT, G. ANDERSON, Ophthalmological Society of Great Britain.
CROSBY, Alderman THOMAS BOOR, London Corporation.
CROSSLEY, WILLIAM J., Manchester Consumption Hospital.
CROWE, GEORGE WYNDHAM, M.D., Worcester and Herefordshire Branch of the National Association for the Prevention of Consumption.
CROWLEY, Dr. R. L., Bradford Branch of the National Association for the Prevention of Consumption.
CUFFLIN, Alderman, Islington Metropolitan Borough.
CULHAM, Councillor, Hastings Corporation.

DALEY, Dr., Borough of Bootle.
DALTON, Councillor MARK, Metropolitan Borough of Poplar.
DALZIEL, Professor T. KENNEDY, Anderson's College Medical School.
DAVIES, Councillor, M.D., Borough of Shoreditch.
DAVIES, Dr. A., South Monmouthshire Branch of the British Medical Association.
DAVIES, D. GLADSTONE, M.R.C.V.S., Town Council of Swansea.
DAVIES, D. S., M.D., M.O.H., University College of Bristol.
DAVIES, Dr. EBENEZER, M.O.H., Town Council of Swansea.
DAVIES, Dr. SIDNEY, M.O.H., Metropolitan Borough of Woolwich.
DAWES, H. J., F.R.C.V.S., Midland Counties Veterinary Association.
DAY, E. J., M.O.H., Town Council of Dorchester.
DEARDEN, Councillor, Corporation of Manchester.
DELANEY, W. P., Dublin Victuallers' Association.
DELÉPINE, Professor SHERIDAN, M.D., Victoria University; and Manchester Literary and Philosophical Society.
DELVES, Alderman, Corporation of Tunbridge Wells.
DEMPSEY, Professor M. J., M.D., F.R.C.P., Catholic University School of Medicine, Ireland.
DES VOEUX, HAROLD, M.D., M.O.H., City Council of Westminster.
DEWAR, Professor, F.R.C.V.S., National Veterinary Association.
DICK, Councillor JAMES, Corporation of Glasgow.
DICKINSON, Alderman, J.P., County Borough of Burnley.
DINGLE, C. V., M.D., M.O.H., Corporation of Middlesborough.
DIXEY, Dr. HARRY E., Worcestershire County Council.
DOBBING, W. NEWTON, M.R.C.V.S., South Durham and North Yorkshire Veterinary Medical Association.
DODD, Councillor, Corporation of Tunbridge Wells.
DOLAMORE, Dr. W. H., British Dental Association.
DOLAN, Dr., Yorkshire Branch of British Medical Association.
DOMVILLE, Councillor EDWARD JAMES, Exeter Corporation.
DOUGAN, Bailie, Glasgow Corporation.
DRESCHFELD, Professor T., M.D., Owens College, Manchester.
DRUCE, G. CLARIDGE, Oxford Corporation.
DUDFIELD, Dr. REGINALD, M.O.H., Paddington Metropolitan Borough.
DUDGEON, G. R., M.R.C.V.S., Veterinary Medical Association of North of England.
DUNCAN, C. B., North of England Sanitary Inspectors' Association.
DUNCAN, Dr. EBENEZER, Faculty of Physicians and Surgeons, Glasgow.
DUNSMURE, JAMES, M.D., F.R.C.S.E., Royal College of Surgeons, Edinburgh.
DUNSTAN, JOHN, M.R.C.V.S., Devon and Cornwall Branch of the National Association for the Prevention of Consumption.

EAST, Mrs. F. A., Poplar and Stepney Sick Asylum District.
EASTON, Councillor E. G., Metropolitan Borough of Fulham.
EBRINGTON, Viscount HUGH FORTESCUE, D.L., J.P., County Council of Exeter.

EDWARDS, TREVOR, Wakefield County Council.
ELLIOTT, Councillor, Town Council of Dundee.
ELLISON, JAMES, City of Liverpool and District Cowkeepers' Association.
ELLISTON, W. A., M.D., J.P., President of the British Medical Association.
EVANS, Dr. E. D., Wrexham and District Branch of the National Association for the Prevention of Consumption.
EVANS, Dr. RICHARD, Denbigh County Council.
EVANS, Dr. W. ARNOLD, M.O.H., Corporation of Bradford.
EVELYN, WILLIAM A., M.A., M.D., Yorks Branch of the National Association for the Prevention of Consumption.

FAWCITT, ISAAC, Bradford and District Butchers' Association.
FAYRER, Sir J., K.C.S.I., M.D., F.R.S., Falmouth Corporation.
FENOULHET, Dr. E. C., East Kent Joint Committee for Appointing Medical Officers of Health.
FENWICK, Mrs. BEDFORD, Registered Nurses' Association.
FIELD, WILLIAM, M.P., Dublin Victuallers' Association.
FILDES, Councillor, Corporation of Manchester.
FINLAYSON, Dr. JAMES (President), Faculty of Physicians and Surgeons of Glasgow.
FIRTH, Alderman J., County Borough of Huddersfield.
FITZGIBBON, HENRY, Association of British Postal Medical Officers.
FITZHERBERT-BROCKHOLES, W., Royal Lancashire Agricultural Society.
FLETCHER, JAMES, Lancashire County Council.
FLETCHER, J. DOUGLAS, Ross and Cromarty County Council.
FLITCROFT, Dr. T. E., Corporation of Bolton.
FLOWERS, Councillor R., Newcastle-upon-Tyne.
FORD, J. B. P., Wakefield County Council.
FORMAN, E. B., M.D., London County Council.
FORRESTER, J. H., Parish of Birmingham.
FORSTER, Alderman J., J.P., Corporation of St. Helens.
FOSBROKE, G. H., Worcestershire County Council.
FOSKETT, ROBERT, Poplar and Stepney Sick Asylum District.
FOSTER, SIR MICHAEL, K.C.B., F.R.S., Professor of Physiology, British Association for the Advancement of Science.
FOWLER, KINGSTON, M.D., Clinical Society.
FOX, Dr. E. LONG, Three Counties Branch of the National Association for the Prevention of Consumption.
FRANCE, ERIC, M.B., Medical Psychological Association.
FRANCIS, Councillor, Borough of Southend-on-Sea.
FRANK, F. BACON, Wakefield County Council.
FRANKLAND, Professor P. FARADAY, Institute of Chemistry of Great Britain and Ireland.
FRASER, Dr. A. M., M.O.H., Portsmouth Corporation.
FRASER, Alderman EVAN, Hull Corporation.
FRASER, Professor THOMAS R., F.R.S., M.D., LL.D., University of Edinburgh; and Royal College of Physicians, Edinburgh.
FRY, HENRY A., Bath Butchers' Association.
FURLONG, ROBERT O'BRIEN, C.B., Dublin Branch of the National Association for the Prevention of Consumption.
FYFE, PETER, Sanitary Inspectors' Association of Scotland.

GABE, J. R., M.D., Brussels Medical Graduates' Association.
GALBRAITH, Dr. JAMES J., Woodburn Sanatorium.
GALLIERS, Councillor, Brighton Corporation.
GARLAND, Dr., M.O.H., Yeovil Corporation.
GARLAND, C. A. S., Yeovil Corporation.
GARLAND, CHARLES H., Postal Telegraph Clerks' Association.
GARNETT, Professor W., North of England Institute of Mining and Mechanical Engineers.
GASKELL, C. G. MILNES, Wakefield County Council.
GAY, Dr., Wandsworth Metropolitan Borough.

GEPP, M., M.O.H., D.P.H., Shrewsbury Corporation.
GETLEY, Alderman, Birkenhead Corporation.
GIBB, R. SHIRRA, Highland and Agricultural Society of Scotland.
GIBSON, Dr. G. A., Royal College of Physicians, Edinburgh.
GIDDINGS, R. N. RITCHIE, M.B., Associated British Postal Medical Association.
GILLIES, Councillor, Gateshead Corporation.
GLAISTER, Professor JOHN, Glasgow University.
GLEN, Dr. JAMES, J.P., North Riding (Northallerton) County Council.
GODFREY, ERNEST H., Central Chamber of Agriculture.
GODLEE, RICKMAN J., F.R.C.S., Royal College of Surgeons.
GOLDIE, Councillor L. A., Rochester Corporation.
GOODMAN, Dr. R. N., Thames Valley Branch of the British Medical Association.
GORDON, Councillor COLIN, Poplar Metropolitan Borough.
GORDON, Dr. W., South-West Branch of the British Medical Association.
GORNALL, Dr. J. G., Warrington Corporation.
GOUGH, ARTHUR, Birmingham Butchers' Trade and Benevolent Association.
GOULD, Dr. J. E., M.O.H., Bolton Corporation.
GRAHAM, ALEXANDER, F.S.A., Royal Institute of British Architects.
GRAY, Dr. MURRAY, Three Counties Branch of the National Association for the Prevention of Consumption.
GREEN, ABRAHAM, M.R.C.V.S., Dudley Corporation.
GREEN, Dr. R., M.O.H., Gateshead Corporation.
GREENHAIGH, Dr., M.O.H., Accrington Corporation.
GREENWOOD, M., M.D., County Borough of Crewe.
GRIFFITH, Dr. AUGUSTINE, M.O.H., Hove Corporation.
GRIFFITHS, L. M., M.R.C.S., Bristol Medical Library.
GROSVENOR, Dr. O. A., Hampstead Borough.
GWYN, EDMUND, M.D., Incorporated Society of Medical Officers of Health.
GWYNN, NEVILLE, M.B., Nordrach Sanatorium.

HALL, EDWIN T., F.R.I.B.A., Royal Institute of British Architects.
HALL, J. DE HAVILAND, M.D., Laryngological Society of London.
HAMILTON, Professor D. J., F.R.C.S.E., F.R.S.E., University of Aberdeen.
HAMILTON, Dr. W. M., M.O.H., D.P.H., Eccles Corporation.
HANDFORD, HENRY, M.D., British Medical Association; and Nottingham County Council.
HANSELL, J. T., Nottingham County Council.
HARDING, Councillor, Sanitary Town Council, Eastbourne.
HARDMAN, ALEXANDER, Rochdale Corporation.
HARKUS, G., Councillor, Newcastle Corporation.
HARPER, Alderman, Woolwich Corporation.
HARPER, Dr. CHARLES, M.O.H., Bath Rural District Council.
HARRIS, A. E., M.O.H., Metropolitan Borough of Islington.
HARRIS, Dr. A. W., South Branch of the Incorporated Society of Medical Officers of Health.
HARRIS, Dr. F. D., M.O.H., St. Helens Corporation.
HARRISON, Alderman, J.P., Sunderland Corporation.
HARRISON, Alderman T. H., J.P., Derby Borough.
HART, Dr. HERBERT, Salvation Army.
HART, J. T., London Central Meat and Poultry Markets Association.
HARTIGAN, T. T. P., East Sussex County Council.
HARWOOD, ALFRED, East Suffolk County Council.
HASLAND, JOHN, Bury Corporation.
HAWKINS, Rev. E. C., Board of Guardians, City of London Union.
HAWKYARD, Councillor Dr. A., Leeds Corporation.
HAWORTH, Councillor GEORGE, Burnley Corporation.
HAY, Professor MATTHEW, M.D., M.O.H., Aberdeen Town Council; and Aberdeen University.
HEALD, Councillor B. G., Leeds Corporation.
HEAP, WILLIAM, Manchester and Salford Butchers' Association.
HECTOR, C. MONRO, B.Sc., M.D., University College, Sheffield.

HEDLEY, MATTHEW, F.R.C.V.S., Veterinary Medical Association, Ireland.
HEDLEY, Dr. WILLIAM, Newcastle Corporation.
HEMBOROUGH, J. W., M.D., M.O.H., Northumberland County Council.
HENRY, J., M.D., M.O.H., Corporation of Rochdale.
HEWITT, Dr. D. B., Cheshire County College.
HEWLETT, Dr. R. TANNER, London School of Tropical Medicine; and Seamen's Hospital Society.
HICKS, FREDERICK, Metropolitan Cattle and Sheep Trade Association.
HILL, Dr., M.O.H., Durham County Council.
HILL, A. BOSTOCK, M.D., M.O.H., Birmingham Corporation; and Warwickshire County Council.
HILL, JOHN, Metropolitan Cattle and Sheep Trade Association.
HILLABY, ARTHUR, Pontefract Corporation.
HILLS-JOHNES, Lt.-Gen. Sir JAMES, University of Wales, Brecon.
HINDMARSH, Alderman E., Gateshead Corporation.
HIRONS, Alderman GEO. M., Bournemouth Corporation.
HIRST, GEORGE, Councillor, Batley Corporation.
HIRST, ROWLAND, Metropolitan Borough of Stepney.
HITCHON, H. H. J., M.O.H., Heywood Corporation, Lancs.
HOBDEN, Councillor R. C., Lewes Corporation.
HODGKINSON, ALEX., M.B., Manchester Literary and Philosophical Society; and Manchester Hospital for Consumption and Diseases of Throat.
HODGSON, Dr. W., Cheshire County Council.
HOLBURN, A., M.R.C.V.S., Manchester Corporation.
HOLROYDE, E. J., M.D., M.O.H., Chatham Corporation.
HOLT, Alderman THOMAS (Mayor), Lancashire Corporation, Bury.
HOPE, Professor E. W., M.D., University College, Liverpool; and Corporation of Liverpool.
HOPKIN, Councillor M., Incorporated Butchers' and Dealers' Association.
HORNE, Alderman J.P. (Mayor), Derby Borough.
HORNER, ISAAC, Leeds District Cowkeepers' Association.
HORSFALL, Councillor, Bradford and District Butchers' Association.
HOULDING, Alderman JOHN, J.P., Liverpool Corporation.
HOWARD, HENRY, Worcestershire County Council.
HOWARTH, Dr. W. J., M.O.H., Derby Borough.
HOWES, WILLIAM, Metropolitan Borough of Finsbury.
HUBBERSTY, R. S., M.D., Society for the Prevention and Cure of Consumption in the County of Durham.
HUDSON, Councillor ALBERT, Wakefield Corporation.
HUGHES, Councillor, J.P., Corporation of Cardiff.
HUGHES, W. H. (Mayor), Margate Corporation.
HULFORD, C. F., M.R.C.V.S., Southern Counties Veterinary Medical Association.
HUNTER, WM. LOVELL, M.O.H., Pudsey Corporation.
HUNTING, W., F.R.C.V.S., National Veterinary Society.
HUTTON, Dr., Manchester Hospital for Consumption.

IMRIE, Alderman, Borough of South Shields.
INNES, Lieutenant-Colonel F. N., Aberdeen County Council.
ISHERWOOD, THOMAS, M.A., LL.D., Southport Corporation.

JACKSON, Dr. J. C., M.O.H., Fulham Metropolitan Borough.
JACKSON, Alderman T. V., Wolverhampton Corporation.
JACOBS, Alderman T. WINDSOR, Cardiff Corporation.
JAGO, Councillor, Borough of Hove.
JEFFERYS, J. H., Kendal Town Council.
JEFFREYS, A. F., M.P., Central Chamber of Agriculture.
JESSOP, Alderman W. H., J.P., Huddersfield Corporation.
JOHNSON, G. PETGRAVE, M.D., M.O.H., Borough of Stoke-upon-Trent.
JONES, A. EMRYS, M.D., J.P., University of Wales.

JONES, Dr. EVAN, Finsbury Metropolitan Borough.
JONES, Councillor H. J., Fulham Metropolitan Borough.
JONES, Dr. J. HOWARD, M.O.H., Newport County Borough.
JONES, ROBERT, M.D., Medico-Psychological Association.
JONES, S. HERBERT, West of England and South Wales Branch Incorporated Society of Medical Officers of Health.
JONES, Alderman THOMAS, Newport County Borough.
JONES, T. EATON, Liverpool Corporation.
JOWETT, Alderman J. D., Bradford Corporation.

KAY, JAMES, Royal Lancashire Agricultural Society.
KAYE, JAMES R., M.B., D.P.H., M.O.H., Wakefield County Council.
KEMPSTER, Dr. W. H., Battersea Metropolitan Borough.
KENNEDY, HENRY, Southport Corporation.
KENT, Professor A. F. STANLEY, University College, Bristol.
KENWOOD, Dr. H. R., M.O.H., Childhood Society; and Incorporated Society of Medical Officers of Health, Croydon Branch.
KIDSON, A. F. (Town Clerk), Folkestone Corporation.
KILBURN, Alderman, Dewsbury Corporation.
KING, GEORGE E., M.R.C.V.S., Royal Counties Veterinary Medical Association.
KING, Bailie JOHN, Glasgow Corporation.
KING, J. T., M.R.C.V.S., Bournemouth Corporation; and Southern Counties Veterinary Medical Association.
KINGSBURY, Alderman G. C., Blackpool Corporation.
KINKEAD, Professor R. J., M.D., J.P., Queen's College, Galway.
KIRKWOOD, JAMES, Glasgow United Fleshers' Society.
KNOWLES, ALEXANDER, Inverness Town Council.

LAMBERT, Councillor RICHARD B., York Corporation.
LAMBERT, GEORGE, M.P., Exeter County Council.
LANCASTER, Councillor W. J., Birmingham Corporation.
LANDER, W. H., Salop County Council.
LAURIE, Councillor, Derby Corporation.
LAWRIE, J. MACPHERSON, M.D., J.P., Dorset County Council.
LAWSON, Councillor EDWARD, Leeds Corporation.
LEADBETTER, E. W., City of Sheffield Butchers' Association.
LEE, Councillor WILLIAM, Coventry Corporation.
LEITH, Professor R. F. C., M.D., Birmingham University.
LEVINSOLM, H. R., Jewish Board of Guardians.
LINDSAY, JAMES A., M.D., Natural History Philosophical Society; and Queen's College, Belfast.
LINDSEY, JOHN, London Butchers' Trade Association.
LISTER, Lord, M.D., LL.D., F.R.S., British Association for the Advancement of Science; and Royal Society.
LISTER, JOSEPH, City of Sheffield Butchers' Association.
LITCHFIELD, F., National Deposit Friendly Society.
LITT, W. E., M.R.C.V.S., Salop County Council.
LITTLE, Dr. HENRY S., Reading and Upper Thames Branch of the British Medical Association.
LITTLEJOHN, Sir HENRY D., M.D., M.O.H., Edinburgh University.
LITTLEJOHN, Dr. T. H., M.O.H., Scarborough Corporation.
LITTLEWOOD, Dr., Nottingham Association for the Prevention of Consumption.
LIVINGSTONE, Alderman, M.D., Durham County Council.
LLOYD, F. J., British Dairy Farmers' Association.
LLOYD, J. S., M.R.C.V.S., Health Committee of Sheffield City Council.
LOE, Alderman Dr. J. S., Leeds Corporation.
LOUIS, D. A., North of England Mining and Mechanical Institute.
LOWEY, THEODORE, City of Liverpool and District Butchers' Association.
LOYD, A. KIRKMAN, K.C., M.P., Berkshire County Council.

LUND, Councillor WILLIAM, York Corporation.
LUPTON, W. C., J.P. (Mayor), Bradford Corporation.
LUSH, WILLIAM VAWDREY, M.D., Dorset and Hants Branch of the British Medical Association.
LYNHAM, Professor JOHN ISAAC, M.D., Queen's College, Galway.
LYON, Bailie ALEXANDER, Aberdeen County Council.
LYON, B. A., North London Hospital for Consumption.

MCALDOWIE, Dr. A. M., M.D., Staffordshire Branch, British Medical Association.
MACALISTER, CHARLES J., M.D., Royal Southern Hospital, Liverpool.
MCCANDLISH, Councillor G., Leeds Corporation.
MACCARTHY, Councillor, Dr., St. Pancras Metropolitan Borough.
MCCARTHY, JUSTIN C., M.D., Salop County Council.
MCCAW, JOHN, M.D., Ulster Medical Society.
MCCLEAN, Councillor, Brighton Corporation.
MCCLEARY, Dr. G. F., M.O.H., Battersea Borough Council.
MCDOUGALL, Alderman, Manchester Corporation.
MCKINNA, J., F.R.C.V.S., Yorks Veterinary Medical Society.
MACLAY, Councillor J.P., Orphan Homes of Scotland and Sanatoria.
MCMANUS, L. S., M.D., Battersea Borough Council.
MACQUEEN, Professor J., F.R.C.V.S., Central Veterinary Association.
MCVAIL, J. C., M.D., Incorporated Society of Medical Officers of Health; and Stirling County Council.
MCWEENEY, Professor E. J., M.D., University School of Medicine of Ireland.
MAGGS, W. A., Odontological Society.
MAGUIRE, Dr. ROBERT, Medical Society of London.
MALCOLM, JOHN, M.R.C.V.S., Veterinary Deputy for Corporation of Birmingham.
MANLEY, Dr. T. H., Corporation of West Bromwich.
MANNING, H. G., South Branch of British Medical Association.
MARSDEN, Dr. R. SYDNEY, M.O.H., Corporation of Birkenhead.
MARSH, HOWARD, F.R.C.S., Schools Association Medical Officers; and Clinical Society of London.
MARSHALL, Mrs. LEONARD, Guardians of the Poor, Islington.
MARTIN, Dr. F. W., M.O.H., Corporation of Brighouse.
MARTIN, SIDNEY, M.D., F.R.S., Medical Society of London.
MARTINEAU, JOHN, County Council of Southampton.
MASON, Alderman E. G., Corporation of Birkenhead.
MASON, Dr. WRIGHT, D.P.H., M.O.H., Corporation of Hull.
MASSEY, Alderman J., The Scholes, St. Helens.
MASSEY, J. B., County Borough of Burnley.
MEARS, Mrs. ISABELLA, L.R.C.P., Woodburn Sanatorium.
MELLOR, Alderman Dr., Corporation of Bury.
MENLOVE, Alderman THOMAS, Corporation of Liverpool.
MESSITER, Dr., Dudley Corporation.
METTAM, Professor A. E., M.R.C.V.S., Veterinary Medical Association of Ireland.
MIDDLETON, JOHN M., Wholesale Meat and Cattle Salesmen's Association.
MIDDLETON, W. J., Councillor, Town Council of Aberdeen.
MILLARD, C. KILLICK, M.D., M.O.H., Leicester Corporation; and Burton-on-Trent Borough.
MILLIGAN, Councillor Dr. R. A., Northampton Corporation.
MILLSON, GEORGE, M.O.H., Southwark Borough.
MITCHELL, Councillor THOMAS, Greenock Corporation.
MITCHELL, Councillor WALTER H., Bury Corporation.
MONTEFIORE, Lieutenant-Colonel, Charity Organisation Society.
MONTGOMERY, ROBERT J., Apothecaries' Hall, Dublin.
MOODY, H. F., Grimsby Urban Sanitary Authority.
MOORE, Alderman, South Shields Town Council.
MOORE, SAMSON GEORGE, M.O.H., Huddersfield Corporation.
MORGAN, Dr. H., Major, Lichfield Corporation.
MORISON, JOHN, M.D., St. Albans Rural District Council.
MORITZ, Dr. S., Manchester Consumption Hospital.
MORTON, W. J., North London Hospital for Consumption.

MOSSOP, ISAAC, F.R.C.S., Bradford Branch of the National Association for the Prevention of Consumption.
MOTT, F. W., M.D., Medical Psychological Society.
MOULLIN, J. A. M., M.A., M.B., British Gynæcological Society.
MUIR, Professor ROBERT, M.D., Faculty of Physicians and Surgeons of Glasgow.
MUNRO, Dr. HECTOR, Bradford Union.
MURISON, PATRICK, M.B., J.P., M.O.H., County Council of Sutherland.
MURPHY, SHIRLEY F., London County Council.
MURRAY, GEORGE R., M.D., The College of Medicine of the University of Durham.
MUTCH, Alderman, Dr., Nottingham Corporation.
MYERS, THOMAS, National Federation of Meat Traders' Association.

NASMYTH, T. G., M.D., M.O.H., F.R.S.E., Fife County Council.
NAYLOR, Councillor, Derby Corporation.
NEECH, J. T., M.O.H., Halifax Corporation.
NETHERCLIFT, W H., F.R.C.S.E., J.P., Canterbury Corporation.
NEWMAN, G., M.D., Metropolitan Borough of Finsbury.
NEWSHOLME, G. W., Sheffield Union.
NEWTON, Alderman H. W., Newcastle-upon-Tyne Corporation.
NICHOLLS, Dr. GORDON FITZHERBERT, Parish of Birmingham Board of Guardians.
NICOLL, J. M., M.B., Jarrow Corporation.
NIVEN, JAMES, M.B., M.O.H., Owens College, Manchester Corporation.
NORWAY, Dr. N. E., South-West Branch British Medical Association.
NUNN, PHILIP W. G., Bournemouth County Borough.
NUTTALL, W. S., Bolton and District Association of Dairy Farmers.
NUTTER, Councillor, Burnley Corporation.

OATES, THOMAS, London Butchers' Trade Society.
O'CONNOR, BERNARD, North London Hospital for Consumption.
O'CONNOR, J., Poplar and Stepney Sick Asylum.
O'CONNOR, J. E., M.D., M.O.H., Lowestoft Corporation.
O'FLAHERTY, R. G., M.B., Apothecaries' Hall, Dublin.
OLDFIELD, Dr. JOSIAH, Oriolet Hospital.
OLIVER, Professor THOMAS, M.A., M.D., University of Durham College of Medicine.
OMMANEY, Colonel E. L., Greenwich Corporation.
ORMSBY, L. H., M.D., Royal College of Surgeons, Ireland.
OUSTON, THOMAS GEORGE, F.R.C.S., Newcastle-on-Tyne Clinical Society.
OWEN, E. P., M.R.C.V.S., Royal Counties Veterinary Medical Association.
OWEN, ISAMBARD, M.A., M.D., University of Wales, Brecon.
OXLEY, Councillor OLIVER, Huddersfield Corporation.

PAGET, C. E., M.O.H., Northampton County Council.
PARKER, CECIL T., the Hon., Royal Agricultural Society of England.
PARKER, W. R., M.D., Kendal Corporation.
PARKES, Alderman, Bury Corporation.
PARKES, LOUIS, M.D., Sanitary Institute.
PARR, Alderman, Eccles Corporation.
PARSONS, A. R., M.B., Royal Academy of Medicine, Ireland.
PATERSON, W. B., F.R.C.S., British Dental Association.
PATTIN, H. COOPER, M.D., M.O.H., Norwich Corporation.
PAYNE, WILLIAM, National Federation of Meat Traders' Association.
PEARSON, C. E., National Federation of Meat Traders' Association.
PEARSON, T., Folkestone Corporation.
PEASE, Alderman FRANCIS WILLIAMS, Pontefract Corporation.
PEDEN, Councillor, Folkestone Corporation.

PEET, J. O., B.Sc., Reading College.
PENHALE, R. E. L., M.R.C.V.S., Western Counties Veterinary Association.
PENHALE, W., F.R.C.V.S., Devon and Cornwall Branch of the National Association for the Prevention of Consumption.
PENN, Councillor, Tunbridge Wells Corporation.
PERNELL, E. W., Lord Mayor of York, York Corporation.
PESKETT, A. F., M.O.H., Notts Medical Chirurgical Society.
PHILIP, R. W., F.R.S.E., M.D., Royal College of Physicians, Edinburgh ; and Scottish Association of Medical Education of Women.
PHILIPSON, Sir G. HARE, M.D., D.C.L., College of Medicine of the University of Durham.
PHILLIPS, Councillor Dr. E. E., J.P., Bath Urban Sanitary Authority.
PHILLIPS, Councillor WILLIAM, City of Liverpool and District Butchers' Association.
PHILLIPS-CONN, Councillor H. H. D., Reading and Upper Thames Branch of the British Medical Association.
PIGOTT, T. C. H., M.D., M.O.H., Teignmouth Urban District Council.
PILE, Sir THOMAS, Bart., Dublin Corporation.
PILKINGTON, Alderman R., J.P., M.P., St. Helens Corporation.
PINK, Sir WILLIAM, Portsmouth Corporation.
PLUMMER, W. R., M.P., Newcastle and Northumberland Branch of the National Association for the Prevention of Consumption.
POLLARD, Bailie (since deceased), Edinburgh Corporation.
POOLE, CHARLES A., Poplar and Stepney Sick Asylum District.
POOLE, E. E., London Chamber of Commerce.
POPE, FRANK M., M.B., Leicester Branch of the National Association for the Prevention of Consumption.
PORTER, CHARLES, M.D., D.P.H., Manchester and Salford Sanitary Association.
PORTER, Dr. CHARLES, Shrewsbury County Council.
PRATT, REGINALD, M.D., Leicester Branch of the National Association for the Prevention of Consumption.
PRICHARD, R., M.D., Llandaff and Dinas-Powis Rural District Council.
PRIESTLY, JOSEPH, M.D., D.P.H., M.O.H., Borough of Lambeth.
PRINCE, JAMES, Flintshire County Council.
PRITCHARD, G., Borough of Lambeth.
PYE-SMITH, E. H., M.B., F.R.S., University of London.

RAMSAY, JAMES, M.D., M.O., York Branch of the National Association for the Prevention of Consumption.
RAMSDEN, Councillor WILLIAM, Liverpool Corporation.
RAMSEY, Councillor THOMAS, Jarrow Corporation.
RANDALL, J. GURNEY, London Chamber of Commerce (Meat and Cattle Traders' Section).
RANSOM, W. B., M.A., M.D., Notts Association for the Prevention of Consumption.
RANSOME, A. SIDNEY, M.D., D.P.H., Union District Council, Southgate.
RANSOME, Dr. H. F., Manchester and Salford Sanitary Association.
RATCLIFFE, Councillor GEORGE, Leeds Corporation.
READ, MABYN, M.D., M.O.H., Worcester Corporation.
RECKITT, Sir JAMES, Bart., J.P., East Riding County Council.
REDMAN, Alderman F., Southwark Corporation.
REICHEL, HENRY R., University College, North Wales.
REID, GEORGE, M D., M.O.H., Staffordshire County Council.
REID, WILLIAM, London Central Meat and Poultry Markets Association.
RENWICK, GEORGE, M.P., Newcastle-on-Tyne and Northumberland Branch of the National Association for the Prevention of Consumption.
RICHARDS, H. MEREDITH, M.O.H., Croydon County Council.
RITCHIE, R. P., M.D., F.R.S.E., Edinburgh Parish Council.
ROBERTS, JOHN, M.D., Chester Corporation.
ROBERTSON, JOHN, M.D., M.O.H., University College, Sheffield ; County Council, Sheffield ; and Medical Chirurgical Society, Sheffield.
ROBINSON, M. K., M.D., Dover Corporation.

ROBINSON, THOMAS, M.O.H., Leicester Branch of the National Association for the Prevention of Consumption.
ROBINSON, Councillor HENRY, Hull Corporation.
ROBINSON, WILLIAM, M.D., Society for the Prevention and Cure of Consumption in County Durham.
ROBINSON, W. F., Birmingham Board of Guardians.
ROCHE, Dr. ANTONY, Royal University, Ireland.
ROGERS, J. W., Battersea Metropolitan Borough.
ROSE, DAVID, Birmingham Butchers' Trade and Benevolent Association.
RUBIE, Alderman J., Bath Urban Sanitary Authority.
RUSSELL, CHARLES HENRY, D.P.H., Yarmouth Corporation.
RUTHERFORD, Councillor, Jarrow Corporation.
RUTTER, Alderman J. R., Bolton Corporation.
RYLEY, JAMES, M.D., Yarmouth Corporation.
RYMER, Alderman S. L., J.P., Croydon County Council.

SANDERS, CHARLES, M.O.H., County Borough of West Ham; and The Incorporated Society of Medical Officers of Health.
SAVAGE, THOMAS, M.D., Warwickshire County Council.
SAYER, Councillor W. R., Fulham Metropolitan Borough.
SCATLIFFE, A. W., M.O.H., D.P.H., Margate Corporation.
SCHOFIELD, Councillor, Pontefract Corporation.
SCOTT, JAMES C., Society for the Prevention and Cure of Consumption in County Durham.
SCURFIELD, HAROLD, M.D., M.O.H., Sunderland Corporation; and the Society for the Prevention and Cure of Consumption in County Durham.
SEATON, EDWARD, M.D., M.O.H., Surrey County Council.
SELL, G., Town Council of Luton.
SEMON, Sir FELIX, M.D., Laryngological Society of London.
SEPHTON, Dr. R., Lancashire County Council.
SERGEANT, Dr. E., Lancashire County Council.
SETTLE, JOHN, M.O.H., Barrow-in-Furness Corporation.
SEVESTRE, ROBERT, M.D., Leicester Branch of National Association for the Prevention of Consumption.
SHARMAN, MARK, M.B., Rickmansworth Urban District Council.
SHATTOCK, S. J., Pathological Society.
SHAW, Alderman R. M., J.P., Huddersfield Corporation.
SHELLY, Dr. C. E., Schools Association of Medical Officers.
SHELMERDINE, Councillor, Liverpool Corporation.
SHIPLEY, WM., F.R.C.V.S., Eastern Counties Veterinary Medical Society.
SHORT, Alderman E., Newcastle Corporation.
SILCOCK, J. B. (Mayor), Bath Urban Sanitary Authority.
SIMPSON, J. F., Berkshire County Council.
SINCLAIR, HOWARD, M.D., Belfast Branch of the National Association for the Prevention of Consumption.
SKERRITT, E. MARKHAM, M.D., British Medical Association.
SKINNER, D. S., M.D., Willesden District Council.
SLOCOCK, S. H., F.R.C.V.S., Central Veterinary Medical Association.
SMEETH, H. G., Stockport Corporation.
SMITH, Dr., Metropolitan Borough of Wandsworth.
SMITH, Councillor Dr. ALEXANDER, Camberwell Corporation.
SMITH, EDMUND M., M.D., D.P.H., M.O.H., York Corporation.
SMITH, Dr. JOSEPH, The Incorporated Medical Practitioners' Association.
SMITH, J. L., M.D., Queen's College, Belfast.
SMITH, J. T., Leicester Branch of the National Association for the Prevention of Consumption.
SMITH, Councillor P., Bradford Corporation.
SMITH, S., M.R.C.V.S., Eastern Counties Veterinary Medical Society.
SMITH, Alderman T. H., Blackpool Corporation.
SMITH, Alderman W., M.D., Manchester Corporation.
SMITH, Alderman WALTER, M.D., Borough of St. Pancras.

SMITH, W. R., M.D., Metropolitan Borough of Holborn.
SMYTH, G. W., Hospital Saturday Fund.
SNAPE, ERNEST, M.D., Metropolitan Borough of Holborn.
SNOW, W. VICARY, M.D., Dorset and West Hants Branch of the British Medical Association.
SOMERS, F. W., M.R.C.V.S., Yorks Veterinary Medical Society.
SOMERVILLE, A. F., Somerset County Council.
SPENCE, J. B., M.D., Medico Psychological Society.
SPITTLE, Councillor W. G., County Borough of West Ham.
SPRING, Rev. E. H., National Deposit Friendly Society.
SPURGEON, Alderman, Folkestone Corporation.
SPURRELL, C., F.R.C.S., Poplar and Stepney Sick Asylum District.
SQUAIR, Bailie FRANCIS, Inverness Town Council.
SQUIRE, J. E., M.D., D.P.H., North London Hospital for Consumption; and National Health Society.
STAFFORD, T. J., F.R.C.S., Local Government Board, Dublin.
STAFFORD, Alderman J. E. (Mayor), Brighton Corporation.
STAMFORD, WILLIAM, M.O.H., Tunbridge Wells Corporation.
STAPLETON, ALFRED, Metropolitan Dairymen's Society.
STEAR, Councillor, Saffron Walden Corporation.
STEEDE, B. H., M.D., National Hospital for Consumption, Ireland.
STEEL, JOHN, M.R.C.V.S., Border Counties Veterinary Medical Society.
STEINHAEUSER, J. R., M.O.H., M.B., Lewes Corporation.
STEPHENS, L. E. W., M.O.H., Warblington Urban District Council.
STEVEN, J. L., M.D., Faculty of Physicians and Surgeons.
STEVENS, F., M.O.H., Borough of Camberwell.
STEVENSON, T., M.D., Institute of Chemistry of Great Britain and Ireland; and Chemical Society.
STEWARD, J. A. (Mayor), Worcester Corporation.
STILES, H. J., Royal College of Surgeons, Edinburgh.
STIMPSON, GEORGE, London Central Meat and Poultry Market Association.
STOCKALL, J. J., Manchester Unity, Independent Order of Oddfellows.
STOCKMAN, Professor RALPH, University of Glasgow; and Glasgow Branch of the National Association for the Prevention of Consumption.
STONER, F., City of Liverpool and District Cowkeepers' Association.
STORIE, JOHN, M.R.C.V.S., Scottish Metropolitan Veterinary Medical Society.
STOUT, Alderman E., Newcastle-on-Tyne Corporation.
STRACHEY, EDWARD, M.P., Central Chamber of Agriculture.
STREETEN, F. E., M.O.H., Swindon Corporation.
STROUD, E. L., M.R.C.V.S., Central Veterinary Medical Association.
STUART, J. A. ERSKINE, M.O.H., Batley Corporation.
SUGDEN, Alderman H., Wakefield County Council.
SUTTON, Alderman, Warrington County Council.
SWITHINBANK, HAROLD, Royal Agricultural Society of England.
SWORDER, HORACE, M.O.H., Luton Corporation.
SYMONS, W. H., M.D., M.O.H., Bath Urban Sanitary Authority.

TEMPLEMAN, CHARLES, M.D., M.O.H., Dundee Town Council; and University of St. Andrew's.
TETLEY, Alderman C. F., J.P., Leeds Association for Prevention and Cure of Tuberculosis.
TEW, J. S., M.O.H., Incorporated Society of Medical Officers of Health, Home Counties Branch; and West Kent District Branch.
THOMAS, D. C., M.O.H., D.P.H., Metropolitan Borough of Stepney.
THOMAS, Councillor H. J., Bath Urban Sanitary Authority.
THOMAS, THOMAS, Leeds and District Cowkeepers' Association.
THOMAS, WALTER W., Society of Architects.
THOMPSON, Councillor WILLIAM, Richmond Corporation.
THOMSON, J. ROBERTS, M.D., J.P., British Medical Association; and Hampshire County Council.
THORNE, Dr. W. BEZLEY, Royal British Nurses' Association.

THOROWGOOD, Dr., Society of Apothecaries, London.
THURNAM, W. ROWLAND, M.D., Nordrach-upon-Mendip Sanatorium.
TODD, Miss HELEN, Matrons' Council for Great Britain and Ireland.
TODD, Councillor W. LANG, Edinburgh Corporation.
TOMLIN, WILLIAM, Thanet Rural District Council.
TOPHAM, T., Salop County Council.
TRENCHARD, H. J., Nordrach-upon-Mendip Sanatorium.
TREVELYAN, Professor E. F., M.D., Victoria University; and York College, Leeds.
TROTTER, A. M., M.R.C.V.S., Glasgow Corporation (Police Department).
TUBB-THOMAS, JOHN, D.P.H., M.O.H., Wilts County Council.
TULLIS, JAMES T., Vice-Coroner of the county, Lanarkshire County Council.
TURNER, T. W., M.R.C.V.S., Lincolnshire Veterinary Medical Association.

VACHER, FRANCIS, F.R.C.S., M.O.H., Cheshire County Council.
VALLANCEY, A. DE, Hammersmith Board of Guardians.
VINRACE, Councillor Dr., Kensington Metropolitan Borough.
VOELCKER, J. A., M.D., Royal Agricultural Society.

WACHER, F., M.O.H., Canterbury City Council.
WADE, W. S., M.O.H., Wakefield Corporation.
WAITE, Councillor Dr. D. A., Metropolitan Borough of Paddington.
WAKEMAN, Sir OFFLEY, Bart., Salop County Council.
WALDEN, ROBERT WOOLLEY, Westminster City Council,
WALFORD, EDWARD, M.D., M.O.H., Cardiff Corporation.
WALKER, Councillor Dr. J. WEST, J.P., Lincolnshire (Linsey) County Council.
WALTERS, Dr. J. HOPKINS, Reading Corporation.
WARDLEWORTH, Councillor, Bury Corporation.
WARREN, M., Llandaff and Dinas Powis Rural District Council.
WARRY, Dr. J. K., Hackney Borough.
WATERS, A. C., M.O.H., M.B., Southend-on-Sea Corporation.
WATSON, J. H., City Council of Westminster.
WATSON, WM., M.O.H., Rochester Corporation.
WATT, JAMES P., M.O.H., M.B., Aberdeen County Council.
WATTS, SYDNEY, Yeovil Corporation.
WATTS, W. F., M.O.H., Dewsbury Corporation.
WEAR, A. T., M.D., Northern Counties Hospital for Consumption.
WEATHERLY, LIONEL A., M.D., Medical Psychological Society; and Three Counties Branch of the National Association for the Prevention of Consumption.
WEAVER, J. J., M.O.H., Southport Corporation.
WEEKES, ARTHUR, East Sussex County Council.
WELCH, W., Surrey County Council.
WELLS, ERNEST, Hospital Saturday Fund.
WESTMACOTT, F. H., F.R.C.S., Clinical Society, Manchester.
WETHERELL, Alderman T., Northampton Corporation.
WHARAM, S., M.R.C.V.S., Yorkshire Veterinary Medical Society.
WHEATLEY, JAMES, M.D., M.O.H., Blackburn Corporation.
WHERLEY, Councillor E., Metropolitan Borough of Stepney.
WHERRY, Alderman W. R., J.P., Kesteven County Council.
WHITAKER, Dr. A. B., Wakefield Corporation.
WHITE, JAMES, J.P., LL.D. (Mayor), Borough of Lambeth.
WHITLA, WM., M.D., Royal University of Ireland.
WILD, Councillor GEORGE S., Bootle Corporation.
WILKINSON, Dr. JAMES B., Oldham Borough Council.
WILKINSON, JAMES HOWARD. M.O.H., Dudley Corporation.
WILKINSON, WILLIAM, Derby Corporation.
WILLIAMS, Dr. C. THEODORE, Royal College of Physicians; and Royal Medical and Chirurgical Society.
WILLIAMS, J. H., M.D., Flint Town Council.

WILLIAMS, WILLIAM, M.D., M.A., University College of South Wales and Cardiff.
WILLIAMS, Professor W. OWEN, F.R.C.V.S., National Veterinary Association
WILLOUGHBY, W. G., M.O.H., Sanitary Committee of Eastbourne Town Council.
WILLS, Hon. H. CECIL, Devon and Cornwall Branch of National Association for Prevention of Consumption.
WILSON, Councillor Dr. A., Newcastle-on-Tyne Corporation.
WILSON, Dr. J. L., Edinburgh Parish Council.
WILSON, JOHN, T., M.B., Lanark County Council.
WILSON, Scarlyn, M.O.H., Hastings Corporation.
WINDLEY, Alderman, Leicester Corporation.
WISEMAN, R., Bradford Butchers' Association.
WOODCOCK, Dr. H. de C., Leeds Association for the Prevention and Cure of Tuberculosis.
WOODHEAD, Professor SIMS, M.D., F.R.S.E., University of Cambridge.
WOODHOUSE, Dr. R. H., British Dental Association.
WOOLDRIDGE, Professor G., Royal Agricultural College, Cirencester.
WOOLSTON, C. J. K., Northampton County Council.
WRAY, G. B., D.P.H., M.O.H., Basford Rural District Council.
WRIGHT, Sir THOMAS, Leicestershire Branch of the National Association for the Prevention of Consumption.
WYATT, A., Bath Butchers' Association.

YOUNG, MEREDITH, M.D., M.O.H., D.P.H., Stockport County Borough.
YOUNG, Capt. OLIVER, R.N., M.P., Berkshire County Council.
YUNGE-BATEMAN, M. G., Folkestone Borough.

ALPHABETICAL LIST OF BRITISH CORPORATIONS, SOCIETIES, ETC.,

WITH NAMES OF DELEGATES.

Aberdeen, County Council of.
Innes, Lieut.-Col. F. N.
Watt, James P., M.O.H.

Aberdeen, Town Council of.
Cameron, Kenneth (Sanitary Insp.).
Hay, Matthew, M.D., M.O.H.
Lyon, Bailie Alex.
Middleton, Councillor.

Aberdeen, University of.
Hamilton, Prof. D. J., F.R.C.S.E., F.R.S.E.
Hay, Prof. Matthew, M.D., M.O.H.

Agriculture, Central Chamber of.
The Marquess of Bath.
Godfrey, Ernest H. (Secretary).
Jeffreys, A. F., M.P.
Strachey, Edward, M.P.

Agricultural College, Cirencester (Royal).
Woodridge, Prof., M.R.C.V.S.

Agricultural Society of England (Royal).
Brown, Prof., Sir George, C.B.
Clarke, Sir Ernest.
Parker, The Hon. Cecil T.
Swithinbank, Harold.
Voelcker, Augustus J., M.D., F.I.C.

Agricultural Society (Royal).
See *Lancashire.*

Alloa, Burgh of.
Arrol, Bailie A. T.

Ancient Free Gardeners' Friendly Society.
Boyd, James.

Ancient Order of Foresters.
See *Gloucester.*

Anderson's College. See *Glasgow.*

Apothecaries' Company. See *London.*

Apothecaries' Society. See *London.*

Apothecaries' Hall. See *Ireland.*

Architects, Royal Institute of.
Graham, Alexander, F.S.A.
Hall, Edwin T., F.R.I.B.A.

Architects, Society of.
Thomas, Walter W.

Armourers' and Braziers' Company. (No delegate.)

Barrow-in-Furness, Corporation of.
Chapman, Councillor L. P.
Settle, J., M.O.H.

Basford, Rural District Council of.
Wray, Dr. G. B., D.P.H., M.O.H.

Bath, Butchers' Association.
Fry, Henry A. (Hon. Secretary).
Wyatt, Alexander (President).

Bath, Corporation of (Sanitary Authority).
Phillips, Councillor Dr. E. E., J.P.
Rubie, Alderman J.
Silcock, T. B. (Mayor).
Symons, W. H., M.D., D.P.H., M.O.H.
Thomas, H. J.

Bath, Rural District Council of.
Harper, Dr. Charles, M.O.H.

Bath and West, and Southern Counties Society.
Brown, Sir George, C.B.

Batley, Corporation of.
Blackburn, Alderman John (Mayor).
Hirst, Councillor George (Chairman of Sanitary Committee).
Stuart, Dr. J. A. Erskine, M.O.H.

Battersea, Borough Council of.
Chown, J. C.
McCleary, Dr. G. F.
McManus, L. S., M.D.
Rogers, J. W.

Belfast Natural History and Philosophical Society.
Lindsay, Prof. James A., M.A., M.D.

Belfast, Queen's College.
Lindsay, Prof. James A., M.D.
Smith, J. Lorrain, M.D.

Berkshire, County Council of.
Loyd, Archie Kirkman, K.C., M.P.
Simpson, James Ferguson.
Young, Captain Oliver, R.N., M.P.

Bermondsey, Metropolitan Borough of.
Brown, Richard King, M.B., M.O.H.

Berwick-on-Tweed, Borough of.
Cameron, John, M.R.C.V.S.

Birkenhead, Corporation of.
Cook, Thomas (Mayor).
Getley, Alderman (Chairman of Health Committee).
Marsden, Dr. R. Sydney, M.O.H., F.R.S.E.
Mason, Alderman.

Birmingham, Corporation of.
Barratt, Dr. Alfred.
Cook, Alderman W. (Chairman of Health Committee).
Hill, Alfred Bostock, M.D., M.O.H.
Lancaster, Councillor W. J., J.P.

Birmingham and District Butchers' Trade and Benevolent Association.
Allday, James.
Gough, Arthur.
Rose, David.

Birmingham, Parish of.
Forrester, J. H.
Nicholls, Dr. Gordon F.
Robinson, W. F.

Birmingham, Veterinary Department.
Malcolm, John.

Birmingham, University of.
Hill, Prof. Bostock, M.D., M.O.H.
Leith, Prof. R. F. C., M.A., M.D.

Blackburn, Corporation of.
Wheatley, James M.D., M.O.H.

Blackpool, Corporation of.
Anderson, A. Jasper, M.B., M.O.H.
Kingsbury, G. C., M.D.
Smith, Alderman T. H. (Mayor).

Bodmin, County Council of.
Boscawen, Hon. J. R. de C.

Bolton, Corporation of.
Flitcroft, Dr. T. E.
Gould, Dr. J. E., M.O.H.
Rutter, Alderman J. R. (Chairman of Health Committee).

Bolton and District Association of Dairy Farmers.
Nuttall, W. S.

Bootle, Borough of.
Barlow, Dr. W. N., M.O.H.
Cain, Alderman (Chairman of Health Committee).
Daley, Dr. (Inspector of Nuisances).
Wild, Councillor.

Border Counties Veterinary Medical Society. See *Veterinary.*

Bournemouth, Borough of.
Hirons, Alderman.
King, J. T., M.R.C.V.S.
Nunn, Dr. P. W. G.

Bradford, Corporation of.
Evans, W. Arnold, M.D., M.O.H.
Jowett, Alderman J. W. (Chairman of Health Committee).
Lupton, William C. (Mayor).
Smith, Councillor Philip.

Bradford District Butchers' Association.
Fawcitt, Isaac.
Horsfall, Councillor.

Bradford, Union of.
Munro, Dr. Hector.

Brecon, Corporation of. (No delegate.)

Brighouse, Corporation of.
Martin, Dr. F. W., M.O.H.

Brighton, Corporation of.
Blaker, Councillor.
Galliers, Councillor.
McLean, Councillor.
Newsholme, Dr. Arthur, M.O.H.
Stafford, Alderman J. E. (Mayor).

Bristol Medical Library.
Griffiths, Dr. L. M.

Bristol University College, Faculty of Medicine.
Clarke, J. Michell, M.A., M.D.
Davies, D. S., M.D., M.O.H.

British Association for Advancement of Science.
Foster, Prof. Sir Michael, K.C.B., M.D.
Lister, Lord, M.D., F.R.C.S., F.R.C.S.E., F.R.S., LL.D.

British Dairy Farmers' Association.
Ashcroft, W.
Axe, Professor J. Wortley.
Lloyd, F. J.

British Dental Association.
Dolamore, Dr. W. H. (Treasurer).
Paterson, W. B., F.R.C.S. (Hon. Sec.).
Woodhouse, Dr. R. H. (President).

British Gynæcological Society.
Travers, William, M.D., (President).

British Medical Association, London.
Barr, James, M.D.
Elliston, W. A., M.D., J.P. (President).
Handford, H., M.D.
Skerritt, E. Markham, M.D.
Thomson, J. Roberts, M.D., J.P.

British Medical Association, Dorset and West Hants Branch.
Lush, William Vaudrey, M.D., F.R.C.S.
Snow, William Vicary, M.D., F.R.C.S.

British Medical Association, Reading and Upper Thames Branch.
Ashby, Dr. Alfred, M.O.H.
Little, Dr. Henry S. (President of Branch).
Phillips-Conn, Dr. H. H. (Hon. Sec. of Branch).

British Medical Association, Southern Branch.
Manning, H. J. (Hon. Secretary of Branch).

British Medical Association, South Wales and Monmouth Branch.
Davies, Arthur, M.B.

British Medical Association, South Western Branch.
Bushnell, F., M.D.
Gordon, W., M.D.
Norway, Dr. N. E.

British Medical Association, Staffordshire Branch.
Blumer, F. Milnes, M.B.
Jackson, T. Vincent, F.R.C.S.E.
McAldowie, A.M., M.D., F.R.S.E.

British Medical Association, Thames Valley Branch.
Goodman, Dr. R. N.

British Medical Association, Worcestershire and Herefordshire Branch.
Chapman, Paul, M.D.
Crowe, G. Wyndham, M.D.

British Nurses' Association, Royal.
Bezley-Thorne, W., M.D.
Coster, Mrs.

British Postal Medical Officers' Association.
Browne, J. Walter, M.D.
Campbell, J., M.D., J.P.
Fitzgibbon, Henry, M.D.
Giddings, Robert Ritchie, M.B.

Brussels, Medical Graduates' Association.
Gabe, J. R., M.D.

Burnley, Corporation of.
Dickinson, Alderman, J.P.
Haworth, Councillor.
Massey, J. B. (Sanitary Inspector).
Nutter, Councillor.

Burton-on-Trent, Corporation of.
Millard, Charles Killick, M.D., M.O.H.

Bury (Lancs), Corporation of.
Brindley, A. E., M.D., M.O.H.
Haslam, John (Town Clerk).
Holt, Thomas.
Mellor, Alderman.
Mitchell, Councillor.
Parks, Alderman.
Wardleworth, Councillor.

Camberwell, Corporation of.
Smith, Councillor Dr.
Stevens, Dr., M.O.H.

Cambridge Medical Society.
Allbutt, Professor Clifford, M.D., F.R.S.

Cambridge University.
Allbutt, Professor Clifford, M.D., F.R.S.
Woodhead, Professor Sims, M.D., F.R.S.

Canterbury, Corporation of.
Netherclift, Dr. W. H.
Wacher, Dr. F.

Cardiff, Corporation of.
Hughes, Councillor, J.P.
Jacobs, Alderman T. Windsor, J.P.
Jenkins, Councillor John, J.P.
Walford, Dr. Edward, M.D., M.O.H.

Catholic University Medical School. See *Dublin.*

Central Veterinary Society. See *Veterinary.*

Charity Organisation Society.
Montefiore, Lieut.-Col., late R.A.

Chatham, Corporation of.
Holroyde, J., M.D., M.O.H.

Chelsea, Corporation of.
Holland, T. (Town Clerk).

Chemical Society.
Stevenson, Thomas, M.D.

Chemistry of Great Britain and Ireland, Institute of.
Frankland, Prof. P. Faraday, M.D., F.R.S.
Stevenson, Thomas, M.D.

Cheshire, County Council of.
Hewitt, Dr. D. B.
Hodgson, Dr., M.O.H.
Vacher, Francis, F.R.C.S., M.O.H.

Chester, Corporation of.
Roberts, John, M.D.

Childhood's Society.
Berry, Mrs. Dickenson, M.D.
Kenwood, Dr. H. R., M.O.H.

Congleton, Sanitary Committee of.
(No delegate.)

Consumption. See *Durham.*

Consumption. See *National Association.*

Consumption. See *Nottingham.*

Coventry, Corporation of.
Callaghan, Councillor Dr.
Lee, Councillor (Vice-Chairman of the Sanitary Committee).

Crewe, Corporation of. (No delegate.)

Cromarty. See *Ross and Cromarty.*

Croydon, County Borough of.
Richards, Dr. H. Meredith, M.O.H.

Cupar Fife, County Council of.
Nasmyth, Thomas Goodall, M.D., M.O.H., F.R.S.E.

Denbighshire County Council.
Evans, Dr. Richard.

Derby, Borough of.
Harrison, Alderman, J.P.
Horne, Alderman, J.P. (Mayor).
Howarth, W. J., M.D., M.O.H.
Laurie, Councillor.
Naylor, Councillor.
Wilkinson, W. (Insp. of Nuisances).

Derbyshire County Council.
Barwise, Sidney, M.D., M.O.H.

Devonshire County Council.
Ebrington, Lord.
Lambert, G., M.P.

Dewsbury, Corporation of.
Beattie, Alderman Robert, M.D. (Mayor).
Kilburn, Alderman (Chairman of Sanitary Committee).
Watts, Dr. W. F., M.O.H.

Dorchester, Town Council of.
Day, Dr. E. J., M.O.H.

Dorset, County Council of.
Lawrie, J. Macpherson, M.D., J.P.

Dover, Corporation of.
Barnes, Councillor W. J., J.P. (Mayor).
Best, Dr. D.
Robinson, M. K., M.D.

Dublin, Catholic University Medical School.
Dempsey, Professor M. J., M.D.
McWeeney Professor E. J., M.D.
Roche, Professor A.

Dublin, Corporation of (Public Health Department).
Cameron, Sir Charles A., C.B., M.D., M.O.H.
Pile, Sir Thomas, Bart.

Dublin Victuallers' Association.
Delaney, W. P.
Field, William, M.P.

Dudley, Corporation of.
Green, Abraham, M.R.C.V.S.
Messiter Dr. (Chairman of Sanitary Committee).
Wilkinson, J. H., M.O.H.

Dundee, Town Council of (Sanitary Committee).
Elliot, Councillor.
Templeman, Charles, M.D., M.O.H.

Dundee, Town Council of (Public Slaughter Houses and Markets Dept.).
Baxter, J. A.

Durham, County Council of.
Bartlett, Alderman.
Livingstone, Alderman (Chairman of Health Committee).

Durham, Society for the Prevention and Cure of Consumption in the County of.
Barnard, Lord, D.L., J.P.
Hubbersty, R. S., M.D.
Robinson, William, M.D.
Scott, James C.
Scurfield, H., M.D., M.O.H.

Durham, University of (College of Medicine).
Murray, Prof. G. R., M.D., F.R.C.S.
Oliver, Prof. Thomas, F.R.C.S.
Philipson, Prof. Sir G. H., M.D., D.C.L., LL.D.

Eastbourne, Sanitary Committee of Town Council.
Harding, Councillor Dr. (Deputy Mayor).
Willoughby, W. G., M.D., M.O.H.

Eastern Counties Veterinary Medical Society (See *Veterinary*).

East Kent. See *Kent.*

East Riding County Council. See *Yorkshire.*

East Suffolk County Council. See *Suffolk.*

East Sussex County Council. See *Sussex.*

Eccles, Corporation of.
Hamilton, Dr. W. M., M.O.H.
Parr, Alderman.

Edinburgh, Parish Council of.
Clark, Richard (Chairman).
Ritchie, Robert Peel, M.D., F.R.S.E.
Wilson, Dr. J. Lyon.

Edinburgh, Royal College of Physicians of.
Andrew, J., M.D. (Vice-President).
Fraser, Prof. Thomas R., M.D., F.R.S., LL.D. (President).
Gibson, G. A., M.D.
Philip, R. W., M.D., F.R.S.E.

Edinburgh, Royal College of Surgeons of.
Chiene, John, M.D., F.R.C.S.E. (Vice-President).
Dunsmure, James, M.D., F.R.C.S.E. (President).
Stiles, Harold J. F.R.C.S.E.

Edinburgh University.
Fraser, Professor T. R., M.D., LL.D., F.R.S.E.

Edinburgh, Woodburn Sanatorium, Morningside.
Galbraith, Dr. James J.
Mears, Mrs. Isabella.

Exeter, Corporation of.
Domville, Councillor Edwards James.

Exeter, County Council of.
Ebrington, Lord.
Lambert, G., M.P.

Faculty of Physicians and Surgeons. See *Glasgow.*

Falmouth, Corporation of.
Fayrer, Sir Joseph, Bart., M.D.

Fife, County Council of. See *Cupar, Fife.*

Finsbury, Metropolitan Borough of.
Howes, William.
Jones, Dr. Evan.
Newman, G., M.D., M.O.H.

Flint, Town Council of.
Prince, James.
Williams, John Humphrey, M.D.

Folkestone, Borough of.
Kidson, A. F. (Town Clerk).
Pearson, T. (Inspector of Nuisances).
Peden, Councillor.
Spurgeon, Alderman (Vice-Chairman of Sanitary Committee).
Yunge-Bateman, Dr. M. G., M.O.H.

Fulham, Metropolitan Borough of.
Avern, Councillor E.
Easton, Councillor E. G.
Jackson, Dr. J. C., M.O.H.
Jones, Councillor H. J.
Sayer, Councillor W. R.

Galway, Queen's College.
Kinkead, Prof. R. J., M.D., J.P.
Lynham, John Isaac, M.D.

Gateshead, Corporation of.
Gillies, Councillor (Mayor).
Green, Dr. R., M.O.H.
Hindmarsh, Alderman (Chairman of the Health Committee).

Girdlers' Company.
Purves, Dr. W. Laidlaw.

Glasgow, Anderson's College Medical School.
Buchanan, Dr. R. M.
Burrell, William.
Dalziel, Prof. T. Kennedy, M.B.

Glasgow, Corporation of.
Chalmers, Archibald Kerr, M.D., M.O.H.
Dick, Councillor James.
Dougan, Bailie.
King, Bailie.

Glasgow Corporation, Police Department.
Anderson, Bailie W. F.
Brechin, Councillor.
Chisholm, Samuel, LL.D. (Lord Provost and Lord Lieutenant).
Trotter, A. M., M.R.C.V.S.

Glasgow Faculty of Physicians and Surgeons.
Duncan, Ebenezer, M.D.
Muir, Prof. Robert, M.D.
Steven, John Lindsay, M.D.

Glasgow United Fleshers' Society.
Brechin, Matthew.
Kirkwood, James.

Glasgow University.
Anderson, Professor McCall, M.D.
Glaister, Professor John, M.D.
Stockman, Professor Ralph, M.D.

Gloucester, Ancient Order of Foresters.
Chapman, A.

Gravesend, Corporation of.
Cooper, Alderman John Hanks, J.P.

Greenock, Corporation of.
Baxter, Bailie.
Bennett, Councillor.
Brown, Councillor.
Mitchell, Councillor.

Greenwich, Corporation of.
Annis, Dr. E. G., M.O.H.
Baker, Captain R. L.
Ommaney, Colonel E. L., C.S.I.

Grimsby, Urban Sanitary Authority of.
Moody, H. F., Sanitary Inspector.

Hackney, Metropolitan Borough of.
Warry, John King, M.D.

Halifax, Corporation of.
Coe, Alderman John F., J.P.
Neech, Dr. James Thomas.

Halifax, Royal Infirmary of.
Alexander, Reginald G., M.D.

Hammersmith Guardians of the Poor.
Vallancey, Dr. A. de.

Hampshire, County Council of.
Martineaux, John.
Thomson, J. Roberts, M.D., J.P.

Hampstead, Borough of.
Andrews, E. Collingwood, M.D.
Grosvenor, O. A., M.D.

Hanley, County Borough of.
Clare, Dr. J., M.O.H.

Hastings, Corporation of.
Culham, Councillor (Chairman of Sanitary Committee).
Wilson, Dr. Scarlyn, M.O.H.

Heywood, Corporation of.
Hitchon, Dr. H. H. I., M.O.H.

Highland and Agricultural Society of Scotland.
Gibb, R. Shirra, M.B., J.P.

Holborn, Metropolitan Borough of.
Aldridge, Councillor (Vice Chairman of Public Health Committee).
Bond, William Arthur, M.D., M.O.H.
Canney, Councillor The Rev. E.
Smith, Councillor William Robert, M.D.

Hospital Saturday Fund.
Bevan, Thomas.
Bunn, W. G.
Dear, A. J.
Smyth, G. W.
Wells, Ernest.

Hove, Borough of.
Godrevy, Councillor Jago.
Griffith, Augustine, M.D., M.O.H.

Huddersfield, County Borough of.
Broadbent, Councillor B. (Deputy Chairman of Health Committee).
Firth, Alderman J. (Chairman of Health Committee).
Jessop, Alderman W. H., J.P. (Chairman of Sanitary Committee).
Moore, Samson C., M.B.
Oxley, Councillor Oliver (Deputy Chairman of Sanitary Committee).
Shaw, Alderman R. M., J.P. (Mayor).

Hull, Corporation of.
Fraser, Alderman Evan, M.B.
Mason, Dr. J. Wright, D.P.H., M.O.H.
Robinson, Councillor Henry, M.B.

Imperial Order of Foresters.
Stockall, J. J.

Institute of Chemistry. See *Chemistry.*

Inverness, Corporation of.
Knowles, Alexander (Sanitary Insp.).
Squair, Bailie Francis.

Ireland, Royal Academy of Medicine of.
Moore, Sir John W., M.D.
Nixon, Sir Christopher, M.D., LL.D., J.P. (President of the Royal College of Physicians, Ireland).
Parsons, A. R., M.B.

Ireland, Apothecaries' Hall of.
Montgomery, Robt., M.B., F.R.C.S.I.
O'Flaherty, Richard G., M.B.

Ireland, Catholic University School of Medicine of.
Dempsey, M. J., M.D. (Professor of Medical Jurisprudence and Sanitary Science).
McWeeney, E. J., M.D., M.A. (Professor of Pathology).
Roche, A. (Professor of Materia Medica and Therapeutics).

Ireland, Royal College of Physicians of.
Craig, James, M.D. (Registrar).
Nixon, Sir Christopher, M.D., LL.D., J.P. (President).

Ireland, Royal College of Surgeons of.
Cameron, Sir Charles, C.B., M.D., M.O.H.
Ormsby, L. Hepenstal, M.D., F.R.C.S.I.

Ireland, Local Government Board of.
Stafford, T. J., F.R.C.S.I. (Medical Commissioner).

Ireland, National Hospital for Consumption of.
Steede, Benjamin H., M.D.

Ireland, Royal University of.
Roche, Dr. Anthony.
Whitla, William, M.D.

Ireland Veterinary. See *Veterinary.*

Islington, Guardians of the Poor of.
Marshall, Mrs. Leonard.

Islington, Metropolitan Borough of.
Brown, Councilior.
Cufflin, Alderman.
Harris, A.E., M.O.H.

James Murray's Royal Asylum.
Urquhart, A. R., M.D.

Jarrow, Town Council of.
Nicoll, John Macdonald, M.B.
Ramsey, Councillor.
Rutherford, Councillor.

Jenner Institute of Preventive Medicine.
Bradford, J. Rose, M.D., F.R.C.S., F.R.S.

Jewish Board of Guardians, London.
Levinsolm, H. R.

Keighley, Borough of.
Carter, George W., F.R.C.V.S.

Kendal, Borough of.
Jeffereys, Councillor J. H.
Parker, W. Rushton, M.D.

Kensington, Borough of.
Alderson, Councillor, M.B., F.R.C.S.
Vinrace, Councillor Dr.

Kent (East), Joint Committee for Appointing Medical Officers of Health.
Adcock, J., J. P.
Fenoulhet, Dr.

Kesteven, County Council of.
Campbell, Councillor, M.D.
Wherry, Alderman N. R.

King's Lynn, Borough of. (No delegate.)

Lambeth, Corporation of.
Priestley, Joseph, M.D., D.P.H., M.O.H.
Pritchard, George (Chairman of Sanitary Committee).
White, James, LL.D., J.P. (Mayor).

Lanarkshire, County Council of.
Tullis, James T.
Wilson, John T., M.B., C.M.O.H.

Lancashire Agricultural Society, Royal.
Fitzherbert-Brockholes, W.
Kay, James.

Lancashire, County Council of.
Fletcher, James.
Sephton, Dr. Robert.
Sergeant, Dr. Edward.

Lancashire Veterinary. See *Veterinary.*

Laryngological Society.
Baber, Edward Cresswell (President).
Beale, Dr. Clifford.
Hall, Francis de Haviland, M.D.
Semon, Sir Felix, M.D.

Leeds Association for the Prevention and Cure of Tuberculosis.
Tetley, Alderman S. F., M.A., J.P.
Woodcock, Dr. H. de Carle.

Leeds, Corporation of.
Ambler, Councillor Francis.
Cameron, James Spottiswoode, M.D., B.Sc.
Hawkyard, Councillor Dr. Arthur (Deputy Chairman of Sanitary Committee).
Heald, Councillor Dr. Benjamin C.
Lawson, Councillor Edward E. (Chairman of the Sanitary Committee).
Loe, Alderman Dr. J. Scarborough.
McCandlish, Councillor Dr. John Gordon.

Leeds and District Cowkeepers' Association.
Homes, Isaac.
Thomas, Thomas.

Leeds, Yorkshire College.
Trevelyan, E. F., M.D.

Leicester, Corporation of.
Biggs, Councllor.
Millard, C. Killick, M.D., D.Sc., M.O.H.
Windley, Alderman (Chairman of the Sanitary Committee).

Leicester. See *National Association for the Prevention and Cure of Consumption.*

Leigh, Corporation of. (No delegate.)

Lewis, Corporation of.
Holden, Councillor Richard C.
Steinhaueser, Dr. John R., M.O.H.

Lichfield, City Council of.
Morgan, Dr. H. Major.

Lincolnshire Veterinary Medical Association. See *Veterinary.*

Lindsey, Lincolnshire, County Council of.
Bacon, Alderman Sir Hickman B., Bart.
Walker, Councillor Dr. John West, J.P.

Linlithgow, County Council of.
Brock, William J., M.B., D.Sc., M.O.H.

Liverpool, Corporation of.
Bligh, Councillor.
Cookson, Alderman Edward H.
Hope, Edward W, M.D., D.Sc. M.O.H.
Menlove, Alderman Thomas.
Ramsden, Councillor William.
Shelmerdine, Councillor.

Liverpool, Sanitary Committee of the Corporation of.
Houlding, Alderman J.
Jones, T. Eaton (Dep. Veterinary Superintendent).

Liverpool and District Butchers' Association.
Lowey, Theodore.
Phillips, Councillor William.

Liverpool and District Cowkeepers' Association.
Backhouse, Thomas.
Ellison, James.
Stoner, J.

Liverpool National Federation of Meat Traders' Association.
Pearson, E. C.

Liverpool Royal Southern Hospital.
MacAlister, Charles J., M.D.

Liverpool University College.
Carter, Professor W., M.D., LL.D., F.R.C.P.
Caton, Professor Richard, M.D., F.R.C.P.
Hope, Professor E. W., D.Sc., M.D.

Llandaff and Dinas Powis, Urban District Council of.
Pritchard, Dr. R., M.O.H.
Warren, M. (Clerk to the Council).

London, Apothecaries' Company of.
Brown, Dr. Burton.
Brown, Dr. F. Gordon, C.I.E.

London, Society of Apothecaries of.
Brown, Dr. Burton.
Thorowgood, John C., M.D., F.R.C.P.

London, Butchers' Trade Society of.
Coggan, W.
Lindsey, John.

London, Central Meat and Poultry Market Association.
Hart, J. T.
Reid, William.
Stimpson, George.

London Chamber of Commerce.
Cooper, William, C. C.
Poole, Edward E.
Randall, J. Gurney.

London, Corporation of the City of.
Collingridge, William, M.D., D.P.H.
Cotman, Dr. J. S. E.
Crosby, Alderman Thomas B., M.D.

London, County Council of.
Collins, W. J., M.D., F.R.C.S.
Forman, E. B., M.D.
Murphy, Shirley F., M.O.H.

London Jewish Board of Guardians.
Levinsolm, H. R.

London Local Government Board.
Bulstrode, Herbert T., M.D., D.P.H.

London, Medical Society of.
Maguire, Robert, M.D.
Martin, Sidney, M.D., F.R.S.

London, Metropolitan Cattle and Sheep Traders' Association.
Hicks, Frederick.
Hill, John.

London, St. George's in the East Board of Guardians.
Bowlan, M. M., M.B., D.P.H.

London School of Tropical Medicine.
Hewlett, Dr. Tanner.

Lowestoft, Corporation of.
Beckett, Alderman James (Mayor).
O'Connor, J. E., M.D., D.P.H., M.O.H.

Luton, Town Council of.
Sell, G. (Town Clerk).
Sworder, Dr. Horace, M.O.H.

Manchester, Clinical Society of.
Westmacott, Frederick H., F.R.C.S.

Manchester, Corporation of.
Coates, Harold, M.B., D.P.H.
Dearden, Councillor.
Fildes, Councillor.
McDougall, Alderman.
Niven, Dr. James, M.O.H.
Smith, Alderman W. (Chairman of Sanitary Committee).

Manchester, Corporation's Markets Department.
Holburn, Alfred, M.R.C.V.S.

Manchester Hospital for Consumption.
Crossley, William J.
Hutton, Henry Richmond, M.B.
Moritz, Sigismumd, M.D.

Manchester Literary and Philosophical Society.
Delépine, Professor Sheridan, M.D.
Hodgkinson, Alexander, M.B.. B.Sc.

Manchester, Owens College.
Dreschfeld, Professor J., M.D., F.R.C.P.
Niven, Dr. James, M.A.

Manchester Pathological Society.
Kelynack, Theodore N., M.D.

Manchester, Salford and District Butchers' Association of.
Chapman, William.
Heap, William.

Manchester and Salford Sanitary Association.
Abbot, F. C.
Porter, Charles, M.D., D.P.H., M.O.H.
Ransome, Dr. H. F.

Manchester Victoria University.
Boyce, Professor R. W., M.D.
Delépine, Professor S., M.D.
Trevelyan, Professor E. L.

Manchester Wholesale Meat and Cattle Salesmen's Association.
Middleton, John M.

Marylebone. See *St. Marylebone.*

Margate, Corporation of.
Hughes, Councillor W. H. (Mayor).
Scatcliffe, Dr. A. W., M.O.H., D.P.H.

Matrons' Council of Great Britain and Ireland.
Todd, Miss Helen.

Meat Traders' Association. See *National.*

Medical and Chirurgical Society.
Sir William Selby Church, Bart.
C. Theodore Williams, M.D.

Medical Officers of Health, Incorporated Society of.
Gwynn, Edmund, M.D.
McVail, J. C., M.D., D.P.H. (President).
Saunders, Charles, M.B., M.O.H.

Medical Officers of Health, Incorporated Society of: Home Counties Branch.
Kenwood, H. R., M.B., D.P.H.
Tew, T. S., M.D., D.P.H.

Medical Officers of Health, Incorporated Society of: Southern Branch.
Browning, Dr. B., M.O.H.
Harris, Dr. A. Wellesley, M.O.H.

Medical Officers of Health, Incorporated Society of: West of England and South Wales Branch.
Jones, Dr. Herbert.

Medical Officers, Schools Association of.
Marsh, Howard, F.R.C.S. (President).
Shelly, Charles Edward, M.D.

Medical Practitioners, Incorporated Association of.
Smith, Dr. Joseph, D.P.H.

Medico-Ethical Society.
Westmacott, Frederick, F.R.C.S.

Medico-Psychological Association.
Beach, Fletcher, M.B. (President).
France, Eric, M.B.
Jones, Robert, M.D. (Hon. Secretary).
Mott, F. W., M.D., F.R.S.
Spence, J. B., M.D.
Weatherley, Lionel A., M.D.

Mercers' Company, London.
Blakesley, T. Holmes.

Merchant Taylors' Company, London.
I'Anson, Edward B. (Master).

Metropolitan Dairymen's Society.
Stappleton, Alfred.

Metropolitan Provident Medical Association.
Browne, J. Arthur, M.B., B.Sc.

Middlesbrough, Corporation of.
Dingle, Charles V., M.D., M.O.H.

Midland Counties Veterinary. See *Veterinary.*

Morley, Corporation of.
(No delegate.)

National Association for the Prevention of Consumption:

Bradford Branch.
Campbell, Henry J., M.D.
Crowley, Ralph H., M.D.
Mossop, Isaac, F.R.C.S.

Cumberland Branch.
Bird, J. B., M.D. (Hon. Secretary).

Devon and Cornwall Branch.
Bloyce, W. H., F.R.C.V.S.
Bushnell, Frank G., M.D., D.P.H. (Hon. Secretary).
Dunstan, Professor John, M.R.C.V.S.
Penhale, W., F.R.C.V.S.
Wills, Hon. H. Cecil.

Dublin Branch.
Field, William, M.P.
Furlong, Robert O'Brien, C.B.

Leicester Branch.
Pope, Dr. Frank.
Pratt, Reginald, M.D.
Sevestre, Robert, M.D., M.A.
Wright, Sir Thomas, Bart.

Newcastle-upon-Tyne Branch.
Murray, G. R.
Olive, T., M.A., M.D.
Philipson, Sir George Hare, M.A., M.D.
Plummer, William, M.P.
Renwick, George, M.P.

National Association for the Prevention of Consumption—continued:

Three Counties Branch.
Fox, E. Long, M.D. (Gloucestershire).
Gray, Dr. Murray (Wiltshire).
Weatherley, Lionel, M.D. (Somerset).

Winchester and District Branch.
Carter, J. Bonham.

York Branch.
Evelyn, W. H., M.D. (Hon. Secretary).
Ramsay, James, M.D.

National Deposit Friendly Society.
Litchfield, F.
Spring, Rev. E. H.

National Health Society.
Squire, J. Edward, M.D., D.P.H.

National Federation of Meat Traders' Association.
Booth, Alderman.
Cozzan, H.
Myers, Thomas.
Pearson, C. E.

National Veterinary Association. See *Veterinary.*

Newcastle-upon-Tyne, Clinical Society of.
Allison, Thomas, M., M.D.
Beattie, Thomas, M.D.
Hawthorne, Frank, M.D.
Ogden, W., M.D.
Ouston, Thomas G., F.R.C.S.

Newcastle-upon-Tyne, Corporation of.
Armstrong, Dr. Henry, M.O.H.
Baty, Councillor, J. A.
Flowers, Councillor R.
Harkus, Councillor C.
Hedley, William (Inspector of Cattle and Provisions).
Newton, Alderman E.
Stout, Alderman E.
Wilson, Councillor A.

Newport, Corporation of.
Jones, Dr. J. Howard, M.O.H.
Jones, Alderman Thomas (Chairman of Sanitary Committee).

Nordrach-upon-Mendip, Sanatorium of.
Gwynn, Dr. Neville.
Thurnam, W. Rowland, M.D.
Trenchard, H. J.

Northampton, Corporation of.
Buszard, Councillor F., M.D., F.R.C.S.
Cogan, Dr. Lee F., M.O.H.
Milligan, Councillor Dr., R.A.
Wetherell, Alderman T.

Northampton, County Council of.
Paget, Dr. C. E., M.O.H.
Woolston, C. J. R. (Chairman of the Public Health Committee).

North Eastern Sanitary Inspectors Association.
Duncan, C. A.

North of England Mining and Mechanical Engineers.
Garnett, Professor William.
Louis, D. A.

North of England Veterinary. See *Veterinary.*

Northern Counties Hospital for Consumption and Diseases of the Chest.
Wear, Arthur T., M.D.

North London Hospital for Consumption.
Lyon, B. A.
Morton, W. J. (Secretary).
O'Connor, Bernard, M.D.
Squire, J. Edward, M.D., D.P.H.

North Riding County Council. See *Yorks.*

Northumberland, County Council of.
Hembrough, J. W., M.D., M.O.H.

Norwich, City Corporation of.
Pattin, Cooper, M.A., M.D.

Nottingham, Corporation of.
Boobbyer, Dr. Henry, M.O.H.
Mutch, Alderman, M.D. (Chairman of Committee).

Nottinghamshire, County Council of.
Handford, Henry, M.D., D.P.H., M.O.H.

Nottingham and District Butchers' Association.
Armitage, A.

Nottingham Medical Chirurgical Society.
Cattle, C. A., M.D.
Peskett, Dr.

Nottinghamshire Association for the Prevention of Consumption.
Billyeald, W. J.
Littlewood, Dr. John O.
Ransome, William B., M.D., M.A., B.Sc.

Nurses' Association. See *British.*

Nurses' Association. See *Registered.*

Oban, Town Council of. (No delegate.)

Oldham, Corporation of.
Wilkinson, James B., M.D., D P.H.

Odontological Society of Great Britain.
Maggs, Dr. W. A. (President).

Ophthalmological Society of the United Kingdom.
Critchett, G. Anderson, M.A., F.R.C.S. (President).

Oriolet Hospital.
Oldfield, Dr. Josiah, M.A.

Otley Urban District Council.
Bennett, Dr. William Edward.

Owens College. See *Manchester.*

Oxford, Corporation of.
Bradshaw, Surgeon General, C.B., M.A., K.H.P.
Collier, William, M.D.
Druce, G. Claridge (Mayor).

Paddington, Corporation of.
Dudfield, Reginald, M.O.H., M.B.
Harris, Alderman Sir George, J.P., L.C.C. (Chairman of the Public Health Committee).
Waite, Councillor Dr. D. A.

Physicians, Royal College of.
Williams, C. Theodore, M.D.

Physicians, Royal College of. See *Ireland.*

Physicians, Royal College of. See *Edinburgh.*

Pontefract, Corporation of.
Hillaby, Dr. Arthur, M.O.H.
Pease, Alderman.
Schofield, Councillor.

Poplar, Corporation of.
Alexander, Dr. Frederick W., M.O.H.
Dalton, Councillor Mark.
Gordon, Councillor Collin.

Poplar and Stepney Sick Asylum District.
East, F. A.
Foskett, Robert.
O'Connor, J.
Poole, Charles A.
Spurrell, C., F.R.C.S.

Portsmouth, Corporation of.
Fraser, A. M., M.O.H., M.B., D.P.H.
Pink, Sir William (Chairman of Sanitary Committee).

Postal Medical Officers. See *British.*

Postal and Telegraph Clerks' Association.
Garland, Charles H.

Pudsey, Corporation of.
Hunter, William L., M.O.H., M.D.

Queen's College. See *Belfast.*

Queen's College. See *Galway.*

Reading College.
Peet, John O., B. Sc.

Reading, Corporation of.
Abram, Councillor G. S., M.B.
Ashby, Alfred, M.O.H., M.B., F.R.C.S.
Day, Henry (Town Clerk).
Walters, Councillor Dr. James H.

Registered Nurses' Society.
Fenwick, Mrs. Bedford.

Richmond (Surrey), Corporation of.
Thompson, Councillor.

Rickmansworth, Urban District Council of.
Sharman, Mark, M.B., D.P.H., M.O.H.

Rochdale, Corporation of.
Hardman, Alderman William.
Henry, Joseph, M.D., M.O.H.

Rochester, Corporation of.
Goldie, Councillor L. A. (Chairman of the Health Committee).
Watson, Dr. William, M.O.H.

Ross and Cromarty, County Council of.
Arras, Walter.
Bruce, William, M.D., L.L.D.
Fletcher, J. Douglas.

Royal Counties Veterinary. See *Veterinary.*

Royal Society.
Broadbent, Sir William, Bart., M.D., K.C.V.O., L.L.D., F.R.S.
Lister, Lord, M.D., LL.D., F.R.S.

Saffron Walden, County Borough of.
Atkinson, Councillor (Mayor).
Stear, Councillor.

St. Albans, Urban Sanitary Authority of.
Morison, John, M.D.

St. Andrews, University of.
Templeman, Charles, M.D.

St. Helens, Corporation of.
Forster, Alderman J., J.P. (Chairman of the Health Committee).
Harris, F. Drew, M.B., M.O.H.
Massey, Alderman J., J.P.
Pilkington, Richard, M.P., J.P.

St. Marylebone, Metropolitan Borough of.
Carter, R. J., M.D., D.P.H.
Snape, E. A., M.D.

St. Pancras, Metropolitan Borough of.
MacCarthy, Councillor Dr. E. F. J.
Smith, Walter, M.D.

Salop, County Council of.
Bowen-Jones, J.
Cleave, E. S.
Lander, K. H.
Litt, W. E., M.R.C.V.S.
McCarthy, Justin, M.D.
Porter, Charles, M.D., M.O.H.
Topham, T.
Wakeman, Sir Offley, Bart. (Chairman of the Sanitary Committee).

Salters, Company of.
(No delegate.)

Salvation Army.
Hart, Arthur H., M.D. (Medical Superintendent).

Sanitary Institute, the.
Blyth, Dr. A. Wynter.
Parkes, Louis, M.D.

Scarborough, Corporation of.
Littlejohn, Thomas H., M.B., F.R.C.S.E., M.O.H.

Scotland, Sanitary Inspectors' Association of.
Fyfe, Peter.

Scottish Association for the Medical Education of Women.
Philip, R. W., M.D., M.A.

Scottish Veterinary. See *Veterinary.*

Seamen's Hospital Society.
Hewlett, Dr. Tanner.

Sheffield Butchers' Association.
Leadbetter, E. W.
Lister, Joseph.

Sheffield, Corporation of.
Robertson, John, M.D., M.O.H.

Sheffield, the Health Committee of the Corporation of.
Lloyd, J. S., M.R.C.V.S. (Veterinary Inspector).

Sheffield Medico-Chirurgical Society.
Robertson. John, M.O.H., M.D. (President).

Sheffield Union.
Bellamy, Dr. John.
Newsholme, C. T. W. (Chairman of the Hospital Committee).

Sheffield, University College of.
Hector, Monro, M.D., B.Sc.
Robinson, John, M.O.H., M.D.

Shoreditch, Metropolitan Borough of.
Alexander, Hugh (Sanitary Inspector).
Davies, Councillor John, M.D.
Lewis, T. F. Bryett, M.D., D.P.H., M.O.H.

Shrewsbury, Corporation of.
Gepp, M., M.O.H., D.P.H.

South Durham Veterinary. See *Veterinary.*

Southend-on-Sea, Corporation of.
Allen, Councillor (Chairman of the Health Committee).
Francis, Councillor J. (Mayor).
Waters, A. C., M.B., M.O.H.

Southern Counties Veterinary. See *Veterinary.*

Southgate, Urban District Council of.
Ransome, A. Sydney, M.B., D.P.H.

Southport, Corporation of.
Isherwood, Thomas, M.A., LL.D. (Mayor).
Kennedy, Henry (Chairman of the Health Committee).
Weaver, J. J., M.O.H.

South Shields, Corporation of.
Boyd, John J., M.B., M.O.H.
Imrie, Alderman.

South Wales and Monmouth, University College of.
Walford, Edward, M.D., D.P.H.
Williams, William, M.D., M.A., D.P.H.

Southwark, Metropolitan Borough of.
Bryan, Councillor T. A., M.A. (Chairman of the Health Committee).
Milson, George, M.O.H.
Redman, Alderman F.

Staffordshire, County Council of.
Bagnall, W. C., M.D., D.P.H., M.O.H.
Brough, W. S.
Reid, George, M.D., D.P.H., M.O.H.

Statistical Society, Royal.
Brabrook, E. W., C.B.

Stepney, Metropolitan Borough of.
Hirst, Alderman Rowland (Chairman of the Health Committee).
Thomas, D. L., M.O.H., D.P.H.
Wherley, Councillor Eugene.

Stockport, Corporation of.
Smeeth, H. G., M.D.
Young, Meredith, M.D., D.P.H., M.O.H.

Stoke-upon-Trent, Corporation of.
Johnson, C. Petgrave, M.D., M.O.H., D.P.H.

Suffolk, East, County Council of.
Harwood, Alfred.

Sunderland, Corporation of.
Harison, Alderman J. P.
Scurfield, Harold, M.D., M.O.H.

Surgeons, Royal College of.
Godlee, Rickman J., F.R.C.S.

Surgeons, Royal College of. See *Edinburgh and Ireland.*

Surrey, County Council of.
Cranleigh, W. Welch.
Seaton, Edward, M.D., M.O.H.

Sussex, East, County Council of.
Brand, Rear-Admiral the Honourable T. S.
Hartigan, T. J. P.
Weekes, Arthur.

Sutherland, County Council of.
Murison, Patrick, M.B., M.O.H., J.P.

Swansea, Corporation of.
Davies, Dr. Ebenezer, M.O.H.
Davies, D. Gladstone, M.R.C.V.S. (Meat and Veterinary Inspector).

Swansea, Incorporated Butchers' and Dealers' Association.
Hopkins, Councillor M.

Swindon, Corporation of.
Streeten, Edward, M.O.H.

Teignmouth, Urban District Council of.
Piggott, F. Cecil, M.D., M.O.H.

Thanet, Rural District Council of the Isle of.
Cook, G. G.
Tomlin, William.

Tunbridge Wells, Corporation of.
Abbott, Councillor.
Delves, Alderman, J.P.
Dodd, Councillor.
Penn, Councillor.
Stamford, William, M.O.H.

Tynemouth, Corporation of.
(No Delegate.)

Ulster, Medical School of.
McCaw, John, M.D.

University College. See *Birmingham.*

University College. See *Bristol.*

University College. See *Liverpool.*

University College. See *Sheffield.*

University College. See *South Wales.*

Veterinary Association, National.
Bradley, Professor O. C., M.R.C.V.S.
Dewar, Professor J. R. U., F.R.C.V.S.
Hunting, William, F.R.C.V.S.
Williams, Professor W. O., F.R.C.V.S.

Veterinary College, Royal.
McFadyean, Professor John, M.B., B.Sc., M.R.C.V.S. (Principal).

Veterinary Medical Association of Ireland.
Hedley, Matthew, F.R.C.V.S.
Mettam, Professor A. E., M.R.C.V.S., B.Sc.

Veterinary Medical Association, Lancashire.
Abson, N. J. S., F.R.C.V.S. (President).

Veterinary Medical Association, Lincolnshire.
Clark, R. W., M.R.C.V.S.
Turner, T. W., M.R.C.V.S.

Veterinary Medical Association, Midland Counties.
Blakeway, John, F.R.C.V.S.
Dawes, H. J., F.R.C.V.S.

Veterinary Medical Association, North of England.
Dudgeon, C. R., M.R.C.V.S.

Veterinary Medical Association, Royal Counties.
King, G. E., M.R.C.V.S.
Owen, E. Percival, M.R.C.V.S.

Veterinary Medical Association, South Durham and North Yorks.
Dobbing, W. Newton, M.R.C.V.S.

Veterinary Medical Association, Southern Counties.
Hulford, C. F., M.R.C.V.S.
King, J. T., M.R.C.V.S.

Veterinary Medical Association, Western Counties.
Bond, P. C., M.R.C.V.S.
Penhale, R. E. L., M.R.C.V.S.

Veterinary Medical Society, Border Counties.
Steel, John, M.R.C.V.S.

Veterinary Medical Society, Central.
Butters, A. L., M.R.C.V.S.
MacQueen, Professor J., F.R.C.V.S.
Slocock, Sydney H., F.R.C.V.S.
Stroud, E. Lionel, M.R.C.V.S.

Veterinary Medical Society, Eastern Counties.
Shipley, William, F.R.C.V.S.
Smith, C., M.R.C.V.S.

Veterinary Medical Society, Scottish Metropolitan.
Aitken, John, jun., M.R.C.V.S.
Storie, John, M.R.C.V.S.

Veterinary Medical Society, Yorkshire.
Clarkson, J., M.R.C.V.S.
McKinna, J., F.R.C.V.S.
Somers, F. W., M.R.C.V.S.
Wharam, S., M.R.C.V.S.

Victoria University. See *Manchester.*

Wakefield, Corporation of.
Hudson, Councillor Albert.
Wade, William Swift, M.O.H.
Whittaker, Alfred Broughton (Sanitary Inspector).

Wales, University of.
Hills-Johnes, Lieut.-Gen. Sir James, G.C.B., V.C.
Jones, A. Emrys, M.D., J.P.
Owen, Isambard, M.D., M.A.

Wandsworth, Metropolitan Borough of.
Gay, John, D.P.H.
Smith, Dr., M.O.H.

Warblington, Urban District Council of.
Stephens, Lockhart E. W., M.O.H.

Warrington, Corporation of.
Gornall, J. C., M.B., D.P.H.
Sutton, Alderman (Chairman of the Health Committee).

Warwickshire, County Council of.
Hill, A. Bostock, M.D., D.P.H., M.O.H.
Savage, Thomas, M.D.

West Bromwich, Corporation of.
Manley, T. H., M.O.H., M.A., M.B.

Western Counties Veterinary. See *Veterinary.*

West Ham, County Borough of.
Bishop, Councillor (Mayor).
Sanders, Charles, M.D., M.O.H.
Spittle, Councillor William G.

Westminster City Council.
Allan, F. J., M.O.H.
Des Voeux, H. H., M.D.
Walden, R. Woolley (Chairman of the Public Health Committee).
Watson, N. H.

West Riding. See *Yorkshire.*

Wigan, Corporation of.
Berry, William, F.R.C.V.S., M.O.H., D.P.H.

Willenhall, Urban District Council of.
(No Delegate.)

Willesden, District Council Sanitary Department.
Skinner, D. S., M.D., M.O.H.

Winchester, Corporation of.
Cancellor, B. D.

Wiltshire, County Council of.
Thomas, John Tubb, D.P.H., M.O.H.

Wolverhampton, Corporation of.
Jackson, Alderman Thomas Vincent.

Woodburn Sanatorium. See *Edinburgh.*

Woolwich, Metropolitan Borough of.
Davies, Sydney, M.D., D.P.H., M.O.H.
Harper, Alderman (Chairman of the Public Health Committee).

Worcester, Corporation of.
Read, Mabyn, M.D., D.P.H., M.O.H.
Steward, J. A. (Mayor).

Worcester, County Council of.
Bund, T. W. (Chairman of the County Council).
Dixey, Dr. H. E.
Fosbroke, G. H., M.O.H., D.P.H.
Howard, Henry (Chairman of the Sanitary Committee).

Yarmouth (Norfolk), Corporation of.
Russell, Charles, D.P.H.
Ryley, James, M.D.

Yeovil, Corporation of.
Garland, Edward C., M.O.H.
Garland, C. A. S.
Watts, Sydney.

York, Corporation of.
Blakey, Councillor Walter.
Border, Alderman Samuel, J.P. (Chairman of the Public Health Committee).
Lambert, Councillor.
Lund, Councillor William.
Smith, Edmund M., M.D., D.P.H., M.O.H.

Yorkshire College. See *Leeds.*

Yorkshire County Council, the East Riding of.
Reckitt, Sir James, Bart., J.P.

Yorkshire County Council, the North Riding (Northallerton) of.
Cheetham, Walter H., M.D., D.P.H., M.O.H.
Glen, James, M.D., M.O.H., J.P.
Hansell, John T.

Yorkshire County Council, the West Riding of.
Edwards, Trevor.
Ford, Councillor T. B. P.
Frank, Councillor F. Bacon (Chairman of the Sanitary Committee).
Gaskell, Alderman C. G. Milnes.
Kaye, James R., M.B., D.P.H., M.O.H.

Yorks Veterinary Society. See *Veterinary.*

ALPHABETICAL LIST OF THE INDIAN AND COLONIAL DELEGATES.

ALLEN, Dr. JAMES F., M.O.H., the Corporation of Pietermaritzburg.

BALFOUR, Dr. LEWIS J., the Government of Victoria, Australia; the Medical Society of Victoria.
BEATTIE, Dr. JOSEPH, the Government of New South Wales, Australia.
BLACKADER, Dr. A. D., the McGill University, Montreal.
BULL, Dr. RICHARD JOSEPH, the Government of Victoria, Australia; the Medical Society of Melbourne.

CHARLES, Major R. HAVELOCK, M.D., I.M.S., the Government of Bengal.
CLARKE, Sir ANDREW, G.C.M.G., the Government of Victoria, Australia.
CROMBIE, Lieut.-Colonel A., M.D., the Government of India.

DANIELS, Dr. C. W. (Government Medical Officer), the Government of British Guiana.

FAIRFAX, Sir JAMES, K.B., the Government of New South Wales, Australia.

HARVEY, Surgeon-General, the Government of India.
HARVEY, Dr. ELDON, the Government of Bermuda.
HENDLEY, Colonel T. H., C.I.E., I.M.S. (Inspector-General of the Civil Hospitals of Bengal), the Government of Bengal.
HOOPER, Surgeon-General W. ROE, the Government of India.
HUTCHEON, Dr. DUNCAN, the Veterinary Department of the Cape Board of Agriculture.

JOHNSON, Dr. OWEN (Civil Medical Department), the Government of Ceylon.

KENDALL, Captain E. A., the Government of Victoria, Australia.
KERR, T. S., M.B., the Government of the Straits Settlements.
KYNSEY, Sir WILLIAM, K.C.M.G., the Government of Ceylon.

MCEACHRAN, Professor DUNCAN, F.R.C.V.S. (the Chief Veterinary Inspector of Montreal), the Government of Canada.
MONTIZAMBERT, F., M.D., F.R.C.S. (Director-General of Public Health), the Government of Canada.
MULLICK, Sarat K., M.B., the Indian Medical Association.

NEWLAND, H. S., M.B., the University of Adelaide.

RUNDLE, Colonel C. S., I.M.S., the Government of Burmah.
RUSSELL, Major A. R. P., I.M.S., the Government of Burmah.

STIRLING, E. C., C.M.G., M.A., F.R.S. (Professor of Biology and Physiology), the University of Adelaide.

TAIT, J. SINCLAIR, M.D., the Government of Newfoundland.
TURNER, ALFRED JEFFERIS, M.D., the Government of Queensland; the Queensland Association for the Prevention of Tuberculosis.

WALCH, C. N. CROSBIE, M.B., the Government of Tasmania.
WILLIAMS, Dr. D. J., the Government of Jamaica.
WILLIAMS, Colonel W. D. C., the Government of New South Wales.

ALPHABETICAL LIST OF INDIAN AND COLONIAL GOVERNMENTS, CORPORATIONS, SOCIETIES, ETC.,

WITH NAMES OF DELEGATES.

AUSTRALASIA.

Adelaide, the University of.
Newland, H. S., M.B.
Stirling, E. C., C.M.G., M.A., F.R.S. (Professor of Biology and Physiology).

Melbourne, the Medical Society of.
Bull, Dr. Richard J.

New South Wales, the Government of.
Beattie, Joseph, L.K., Q.C.P.
Fairfax, Sir James, K.B.
Williams, Colonel W. D. Campbell, (Principal Medical Officer of the Military Forces).

New Zealand, the Government of.
(Subscribed, but sent no delegate.)

Queensland, the Government of.
Turner, Alfred Jefferis, M.D.

Queensland, the Association for the Prevention of Tuberculosis.
Turner, Alfred Jefferis, M.D.

Tasmania, the Government of.
Walch, C. N. Crosby, M.B.

Victoria, the Government of.
Balfour, Dr. Lewis John.
Bull, Dr. Richard Joseph.
Clarke, Lieut.-Gen. Sir Andrew, R.E., C.B., G.C.M.G., C.I.E.
Kendall, Veterinary Captain E. A.

Victoria, the Medical Society of.
Balfour, Dr. L. J.

BERMUDA, the Government of.
Harvey, Dr. Eldon, M.O.H.

BRITISH GUIANA, the Government of.
Daniels, C. Wilberforce, M.B. (Government M.O.H.)

CANADA, the Government of.
McEachran, Professor Duncan, F.R.C.V.S.
Montizambert, F., M.D., F.R.C.S. (Director - General of Public Health).

Montreal, the McGill University of.
Blackader, Dr. A. D.

INDIA.

India, the Government of.
Crombie, Lieut.-Colonel A., M.D., I.M.S.
Harvey, Surgeon - General Robert, C.B., D.S.O., M.D.

Indian Medical Association.
Mullick, Sarat K., M.B.

Bengal, the Government of.
Charles, Major R. Havelock, I.M.S.
Hendley, Colonel T. H., C.I.E., I.M.S.

Burmah, the Government of.
Rundle, Colonel C. S., I.M.S.
Russell, Major A. R. P., I.M.S.

Ceylon, the Government of.
Johnson, Dr. O. (Civil Medical Department).
Kynsey, Sir William, K.C.M.G.

JAMAICA, the Government of.
Williams, Dr. D. J.

MALAY STATES, the Government of the Federated.
Wright, Dr. M. J. (State Surgeon of Perak).

NEWFOUNDLAND, the Government of.
Tait, J. Sinclair, M.D.

SOUTH AFRICA.

Cape Colony, the Veterinary Department of the Board of Agriculture of.
Hutcheon, Duncan, M.R.C.V.S.

Natal, the Corporation of Pietermaritzburg.
Allen, Dr. James F., M.O.H.

STRAITS SETTLEMENTS, the Government of.
Kerr, T. B., M.B. (Principal Civil M.O.H.)

ALPHABETICAL LIST OF FOREIGN DELEGATES.

ARMAINGAUD, Dr., Ligue contre la Tuberculose, France.
ARNOZAN, Dr. H. (Professeur de la Faculté de Médecine); l'Université de Bordeaux; la Faculté de Médecine, Bordeaux.
ARONSTAM, Dr. N. E., the State of Michigan, U.S.A.
AUFFRET, Dr. Ch. (Directeur du Service de Santé de la Marine, Brest); le Ministère de la Marine, France.

BANG, Prof. D. B., Danish Board of Agriculture.
BARADAT, Dr., Société des Anciens Médecins des Armées de terre et de mer, France.
BARBARY, Dr. FERDINAND, Société de Préservation contre la Tuberculose, France.
BÉCLÈRE, Dr. A., la Société Médicale des Hôpitaux de Paris.
BELL, CLARK, American Congress on Tuberculosis.
BENEDEN, Dr. VAN, Gouvernement Provincial de Liège; la Société Médico-Chirurgicale de Liège.
BERNARD, Dr. GUSTAVE, l'Œuvre de la Tuberculose Humaine, France.
BERNAYS, Dr. A. C., American Congress on Tuberculosis.
BERNHEIM, Dr. SAMUEL, l'Œuvre de la Tuberculose Humaine, France.
BIELEFELDT, Geheimer Regierungsrath (Senatsvorsitzender der Regierungsamt); der Heilstätte vom Rothen Kreuz am Grabowsee; Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.
BOETTICHER, IHRE Excellenz Frau Staatsminister, Vaterländischen Frauenvereine vom Rothen Kreuz in der Provinz Sachsen; Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.
BORDAS, Dr. FRÉDÉRIC, le Ministère de l'Intérieur, France; Conseil d'Hygiène Publique et de Salubrité du Département de la Seine.
BORSKI, Dr. (membre du Conseil Municipal); Société pour la Construction et l'Exploitation de Sanatoria populaires aux Pays-Bas.
BOUCHARD, Professor, le Ministère de l'Instruction Publique, France; Société de Biologie.
BROADBENT, SIR WILLIAM, BART., M.D., Società Reale di Napoli; Reale Accademia delle Scienze (Turin).
BROUARDEL, Professor (Doyen de la Faculté de Médecine de l'Université de Paris); le Ministère de l'Instruction Publique; l'Académie de Médecine, France.
BROWN, Dr. GEORGE, American Congress on Tuberculosis.
BROWN, Dr. HORACE M., American Climatological Association; and the State of Wisconsin American Medical Association.

CALMETTE, Professor, le Ministère de l'Instruction Publique, France.
CANTACUZIÈNO, Dr. JEAN, Roumanian Government.
CAPO, Eccellentissimo Señor Don ANTONIO ESPINA Y, Spanish Government.
CARRIÈRE, Dr. HENRI, le Conseil Fédéral Suisse.
CARSOM, R. H., M.D., New Jersey Sanitary Association.
CASSE, Dr., Société Royale de Médecine Publique et de la Topographie Médicale de Belgique.
CERVELLO, Professor VINCENZO, Reale Accademia delle Scienze Mediche in Palermo.
CHANTEMESSE, Professor (Professeur à la Faculté de Médecine); le Ministère de l'Instruction Publique; le Ministère de l'Intérieur, France.
CHÉROT, Dr., Conseil Municipal de Paris.
CLADOS, Dr., the Hellenic Government.
COLLY, M., Conseil Municipal de Paris.
CORNIL, Professor, le Ministère de l'Instruction Publique, France.
CORTEZO, Dr. CARLOS, Spanish Government.

DALAND, Dr. JUDSON, American Medical Association; American Climatological Association.
DENISON, Dr. CHARLES, American Climatological Association.
DIEULAFOY, Professor, le Ministère de l'Instruction Publique, France.
DOCK, Professor GEORGE, University of Michigan, U.S.A.
DONOLAN, F. O., M.D., New York State Medical Association.
DUCLAUX, Professor, le Ministère de l'Instruction Publique, France.
DUPUY, Dr. E., Société de Biologie, France.
DVORAK, K. K., Ober-Sanitätsrath Dr. JOH., Supreme Sanitary Council in Vienna.

EDSON, Dr. CARROLL, American Climatological Association.
EHRLICH, Professor Geheimer Medicinalrath PAUL, Cultus Ministerium, Germany.
ELSNER, Dr. H. L., American Climatological Association.
D'ESPINE, Professor, University of Geneva, Switzerland.
EXCHAQUET, Dr., Directeur, Sanatorium du Grand Hotel, Leysin, Switzerland.

FABER, Dr. KNUD, National foreningen til Tuberkulosens Bekaempelse, Copenhagen.
FAISANS, Dr. LÉON, la Société Médicale des Hôpitaux de Paris.
FLÜGGE, Professor, the Imperial German Government.
FRÄNKEL, Professor Dr. B., Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.
FREUND, Director Dr. RICHARD, der Heilstätte vom Rothen Kreuz am Grabowsee; Landes-Versicherungs-Anstalt, Berlin; Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.

GALLIARD, Dr., la Société Médicale des Hôpitaux de Paris.
GEBHARD, Dr. (Direktor der Landes-Versicherungs-Anstalt der Hansestädte), Landes-Versicherungs-anstalt der Hansestädte; Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.
GERHARDT, Professor Dr., the Imperial German Government; Volksheilstätten-verein vom Rothen Kreuz; Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.
GRAM, Dr. CHR., Repräsentant des Dänischen Staates.
GRANCHER, Professor, le Ministère de l'Instruction Publique, France.
GRANT, Dr. W. E., Mississippi Valley Medical Association.
GUMPRECHT, Professor W., Grossherzoglichen Ministerium, Departement des Innern, Saxe-Weimar.

HAIGHT, Dr. ALLEN T., American Medical Association; Chicago Medical Society; and Chicago Otological and Ophthalmological Society.
HARTZ, Dr. HENRY T., the State of Michigan, U.S.A.
HATCH, JOHN LEFFINGWELL, M.D., American Congress on Tuberculosis.
HAUSHALTER, Professor Dr. P. (Vice-Président du Conseil des l'rud'hommes); l'Université de Nancy, France.
HEPPENHEIMER, AUGUSTE, l'Assistance Publique de Paris.
HEYDWEILLER, Dr., der Heilstätten vom Rothen Kreuz am Grabowsee; Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.
HEYMANS, Professor, Ligue Nationale Belge contre la Tuberculose.
HOBBS, Dr., "la Médecine Moderne"; l'Université de Bordeaux, France.
HOLMBOE, Director, Norwegian Government.
HOLST, Dr. AXEL, Norwegian Government.
HOUDÉ, M., Conseil Municipal de Paris.
HUTYRA, Dr. FRANCIS (Recteur de l'École supérieure vétérinaire); Board of Agriculture, Hungary.

JONG, Dr. R. DE JOSSELIN DE, Société pour la Construction et l'Exploitation de Sanatoria populaires aux Pays-Bas.
JORISSENNE, Dr. G., la Société de Salubrité Publique et d'Hygiène de la Province de Liège.
JOSIAS, Dr. ALBERT, Conseil d'Hygiène Publique et de Salubrité du Département de la Seine ; le Ministère de l'Intérieur, France.

KEMPNER, Dr. WALTER (Oberarzt am kgl. Institut für Infectionskrankheiten); Centralblatt für Bakteriologie und Infectionskrankheiten, Germany.
KING, Dr. HERBERT MAXON, Michigan State Government, U.S.A.
KIROFF, Dr., le Ministère des Affaires Étrangères, Bulgaria.
KORANYI, Professor FREDERIC (Member of the Hungarian Reichstag); Government of Hungary.
KNOPF, Dr. S. A., Medical Society of the County of New York ; American Medical Association ; and American Academy of Medicine.
KOSSEL, Dr., Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.

LALESQUE, Dr., l'Université de Bordeaux, France.
LANCASTRE, Dr. A. DE, Portuguese Government ; la Société de Médecine et de Chirurgie de Porto.
LANDOUZY, L. (Professeur à la Faculté de Médicine) ; le Ministère de l'Instruction Publique ; l'Académie de Médecine ; Société de Biologie, France.
LANNELONGUE, Professeur Dr., le Ministère de l'Instruction Publique ; l'Académie de Médecine, France.
LAQUER, Dr. BENNO, Nassauischer Heilstätten-Verein für Lungenkranke, Germany.
LASALLE, Dr. (Vice-Président de l'Union des syndicats médicaux de France) ; Ligue Française contre la Tuberculose.
LAUNOIS, Dr. P. E. (Professeur agrégé à la Faculté de Médecine de Paris) ; la Société Médicale des Hôpitaux de Paris.
LÉDÉ, Dr., le Ministère de l'Instruction Publique et des Beaux Arts, France.
LEO, S. NEWTON, M.D., Medical and Surgical Society of New York.
LEPELLETIER, M., Conseil Municipal de Paris.
LETULLE, Dr. MAURICE, la Société Médicale des Hôpitaux de Paris.
LEVI, M. MONTEFIORE, Board of Agriculture, Belgium.
LEWIS, Dr. EDWIN, American Congress on Tuberculosis.
LEYDEN, Professor Dr., Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.
LIAUTARD, Professor A. (Dean of the Veterinary Faculty of New York University) ; American Veterinary Medical Association.
LINROTH, Dr. K. M., the Swedish Government.
LOOMIS, Dr. H. P., American Climatological Association.

MCGAHAN, Dr. C. F., American Climatological Association.
MCKLVEEN, JOHN A., M.D., State Board of Health, Iowa, U.S.A.
MALM, O., M.D. (Director of the Veterinary Department of the Board of Agriculture) ; Norwegian Government.
MANKIEWICZ, Dr., Bekämpfung der Tuberculose, Germany.
MARTIN, Dr. G., War Ministry of Belgium.
MEYER, Herr Landesrath F., Der Heilstätte vom Rothen Kreuz am Grabowsee ; Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke ; Landes-Versicherungs-Anstalt Brandenburg.
MICHAÏLOVSKY, Dr. DIMITRY, le Ministère des Affaires Etrangères, Bulgaria.
MÖLLER, Dr. med., ALFRED (dirig. Arzt der Heilstätte des Berlin-Brandenburger Heilstättenvereins) ; Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.

MONOD, Monsieur HENRI, le Ministère de l'Intérieur, France.
MONTENEGRO, Don J. V., Spanish Government.
MOREL, M., Conseil Municipal de Paris.
MORIN, Dr., Sanatorium du Mont-Blanc, Switzerland.
MOSNY, Dr. (Auditeur au Comité Consultatif d'Hygiène de France); le Ministère de l'Intérieur, France.
MOURIER, CHARLES, le Ministère de l'Intérieur, France.
MUSSER, Dr. J. H., Medical Department of the University of Pennsylvania, U.S.A.

NECKE, BANKIER OSCAR, Landes-Versicherungs-Anstalt, Berlin.
NEUMANN, Dr. EDWARD, le Conseil Fédéral Suisse.
NOCARD, M. (Professeur à l'École Vétérinaire d'Alfort, member of the Royal Agricultural Society, England), Conseil d'Hygiène Publique et de Salubrité du Département de la Seine, France.
NOLEN, Professor W., the Dutch Government.

OGIER, Dr. JULES, Comité Consultatif d'Hygiène Publique, France.
OLLIVE, Dr. GUSTAVE (Professeur à l'École de Médecine); le Ministère de l'Instruction Publique et des Beaux Arts, France.
ONODI, Dr. A., Verein der Ungarischen Ohren- und Kehlkopf-ärzte.
OTIS, Dr. EDWARD O., American Climatological Association.
OTTE, Dr. RICHARD, Ortskrankenkasse für Leipzig und Umgegend, Germany.

PANNWITZ, Dr. Oberstabsarzt, Volksheilstättenverein vom Rothen Kreuz; Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.
PETERS, AUSTIN, Commonwealth of Massachusetts; Board of Cattle Commissioners, U.S.A.
PRINTZSKÖLD, Hofmarshal, the Swedish Government.
PROUST, Professeur, le Ministère de l'Instruction Publique; le Ministère de l'Intérieur, France.

RADOVICI, Dr. GEORGES, Mayoralty of Bucharest.
RAISZ, Dr. G. DE (Ministère de l'Intérieur); Hungarian Government.
RANSOM, M., Conseil Municipal de Paris.
RAVENE, Dr. LOUIS, Volksheilstättenverein vom Rothen Kreuz; Deutches Central Komite zur Errichtung von Heilstätten für Lungenkranke.
RAVENEL, MAYSÏCK, P., M.D., the Commonwealth of Pennsylvania; the University of Pennsylvania; Pennsylvania Society for the Prevention of Tuberculosis, U.S.A.
REDARD, Dr., les Chemins de fer de l'État, France.
REICHE, Dr., med., Landes-Versicherungs-Anstalt der Hansestädte, Germany.
RENDU, M. AMBROISE, Conseil Municipal de Paris.
RENZI, Sua Eccellenza Senator ENRICO DE, Italian Government.
REYNOLDS, ARTHUR ROWLEY, M.D., the Mayoralty of Chicago; American Medical Association.
ROBIN, Dr. ALBERT, l'Académie de Médecine, Paris.
ROBINSON, Professor F. C., State of Maine, U.S.A.
ROTHE, Dr. Medicinalrath, C. G., the State of Saxe-Altenburg.
RUATA, Dr. CHARLES, the Italian Government: Università di Perugia.
RYN, Dr. VAN, Board of Agriculture; L[illegible] [illegible]ge contre la Tuberculose, Belgium.

SCHLOESSING, Dr., der Heilstätte vom Rothen Kreuz am Grabowsee; Deutsches Central Komite zur Errichtung von Heilstätte für Lungenkranke.
SCHOOLER, LEWIS, M.D., LL.D., State of Iowa, U.S.A.
SCHRÖTTER, Professor VON, Austrian Government; Heilanstalt Alland, Chefarzt der Volksheilstätte Vogelsang.
SCHUDT, Dr. med. ERNST, der Volksheilstätte für Lungenkranke Frauen und Mädchen; Deutsches Central Komite zur Errichtung von Heilstätte für Lungenkranke.
SCHÜTZ, Professor WILHELM (Geheimrath), Prussian Government.
SECRETAN, Dr. LOUIS, Official Delegate of Canton of Vaud, Switzerland.
SEVERI, Dr. R., "La Clinica Moderna," Italy.
SHRADER, J. C., M.D., American Congress on Tuberculosis; the State of Iowa; the Board of Health, Iowa.
SIMONETTA, Il Cavaliere Dr. LUIGI, Reale Accademia dei Fisiocritici in Siena, Italy.
SPILLMAN, Professor LOUIS, l'Université de Nancy, France.
SPILLMAN, Professor PAUL, l'Université de Nancy, France.
STONE, Dr. A. K., Massachusetts General Hospital; Boston Board of Health, U.S.A.

THOINOT, Dr. L., le Ministère de l'Instruction Publique, France; Conseil d'Hygiène Publique et de Salubrité du Département de la Seine.
THOMAS, Dr. ARTHUR, Department of Agriculture of the United States Government.
THOMASSEN, Professor, Government of Holland; Society of Veterinary Art in the Netherlands.
TROISIER, Dr., la Société Médicale des Hôpitaux de Paris.

UCHERMANN, Dr. V., Facultas Medica Universitatis Reg. Frederic., Norway.
UHLMANN, Dr. CLEMENS, Ortskrankenkasse für Leipzig und Umgegend.

VIVANT, Dr. J. E., Principality of Monaco.
VLEMINCK, Professor, l'Académie Royale de Médecine de Belgique.
VOISIN, FÉLIX, le Ministère de l'Intérieur, France.

WERNER, Dr. (General und Korpsarzt des III. Arméekorps); Volksheilstättenverein vom Rothen Kreuz; Deutsches Central Komite zur Errichtung von Heilstätten für Lungenkranke.
WHITMORE, Dr. B. T., American Medical Association.
WRAY, Dr. W. H., Department of Agriculture of the United States Government; American Veterinary Medical Association.

ZIEMSSEN, Professor D. VON, Deutches Central Komite zur Errichtung von Heilstätten für Lungenkranke.

ALPHABETICAL LIST OF FOREIGN GOVERNMENTS, CORPORATIONS, AND SOCIETIES,

WITH NAMES OF DELEGATES.

AMERICA (United States of).

The Mayoralty of Chicago.
Dr. Arthur Rowley Reynolds.

Board of Agriculture (United States Government).
Passed Assistant Surgeon Arthur R. Thomas.
Dr. William H. Wray.

The Medical Department of the University of Pennsylvania.
Dr. J. H. Musser, Hon. V.P.

State of Michigan.
Dr. Henry J. Hartz.
Dr. N. E. Aronstam.
Mr. Herbert Maxon King.

State of Maine.
Dr. F. C. Robinson.

State of Wisconsin.
Dr. Horace M. Brown.

State of Iowa.
Dr. Lewis Schooler.

University of Michigan.
Dr. George Dock, Hon. V.P.

American Academy of Medicine.
Dr. S. A. Knopf, Hon. V.P.

Massachusetts General Hospital.
Dr. A. K. Stone.

Boston Board of Health.
Dr. A. K. Stone.

The State Board of Health of Iowa.
Dr. John McKlveen.

American Climatological Association.
Dr. Horace Manchester Brown.
Dr. Judson Daland.
Dr. Charles Denison, Hon. V.P.
Dr. Carroll E. Edson.
Dr. H. L. Elsner.
Dr. Edward Otis.
Dr. H. P. Loomis.
Dr. C. F. McGahan.

American Medical Association.
Dr. S. A. Knopf.
Dr. Judson Daland.
Dr. Allen T. Haight.
Dr. Horace M. Brown.
Dr. Arthur Rowley Reynolds.
Dr. B. T. Whitmore.

Pennsylvania Society for the Prevention of Tuberculosis.
Dr. Ravenel.

Chicago Medical Society.
Dr. Allen T. Haight.

Chicago Otological and Ophthalmological Society.
Dr. Allen T. Haight.

Mississippi Valley Association.
Dr. Grant.

Commonwealth of Massachusetts, Board of Cattle Commissioners.
Mr. Austin Peters.

American Veterinary Medical Association.
Prof. A. Liautard.
Dr. W. H. Wray.

The University of Pennsylvania.
Dr. Ravenel.

The Commonwealth of Pennsylvania.
Dr. Ravenel.

American Congress on Tuberculosis.
Mr. Clark Bell.
Dr. Aug. Bernays.
Dr. George Brown.
Dr. Leffingwell Hatch.
Dr. H. Edwin Lewis.
Dr. J. C. Shrader.

The Medical Society of the County of New York.
Dr. S. A. Knopf.

The New Jersey Sanitary Association.
Dr. R. H. Carsom.

The New York State Medical Association.
Dr. F. Donolan.

The New York Medical and Surgical Society.
Dr. S. Newton Leo.

AUSTRIA.

Austrian Home Office and Board of Public Instruction (appointed by the Austrian Government).
Prof. von Schrötter.

Die Heilanstalt in Alland.
Prof. von Schrötter, Hon. V.P.

Supreme Sanitary Council in Vienna (appointed by Government).
Dr. Dvorăk.

BELGIUM.

The Board of Agriculture (appointed by the Belgian Government).
M. Montefiore Levi, Hon. V.P.
Dr. van Ryn, Hon. V.P.

War Ministry (appointed by Government).
Dr. G. Martin, Hon. V.P.

L'Académie Royale de Médecine de Belgique.
Prof. Vleminck, Hon. V.P.

Gouvernement Provincial de Liège.
Dr. van Beneden.

La Société Médico Chirurgicale de Liège.
Dr. van Beneden.

La Société Royale de Médecine publique et de la Topographie Médicale de Belgique.
Dr. Casse.

Ligue Nationale belge contre la Tuberculose.
Prof. Heymans.
Dr. van Ryn, Hon. V.P.

La Société de Salubrité publique et d'Hygiène de la Province de Liège.
Dr. G. Jorissenne.

BULGARIA.

Le Ministère des Affaires Etrangères.
Dr. Mikhaïlovsky, Hon. V.P.
Dr. Kiroff, Hon. V.P.

DENMARK.

Repräsentant des Dänischen Staates.
Dr. Chr. Gram, Hon. V.P.

Danish Board of Agriculture.
Dr. B. Bang, Hon. V.P.

National foreningen til Tuberculosens Bekaempelse.
Dr. Knud Faber.

FRANCE.

Le Ministère de l'Instruction Publique.
Prof. Bouchard, Hon. V.P.
Prof. Brouardel, Hon. V.P.
Prof. Calmette, Hon. V.P.
Prof. Chantemesse, Hon. V.P.
Prof. Cornil, Hon. V P
Prof. Dieulafoy, Hon. V.P.
Prof. Duclaux, Hon. V.P.
Prof. Grancher, Hon. V.P.
Prof. Landouzy, Hon. V.P.
Prof. Lannelongue, Hon. V.P.
Dr. Fernand Lédé.
Prof. Proust, Hon. V.P.
Dr. Thoinot, Hon. V.P.

Le Ministère de l'Intérieur.
Monsieur Henri Monod.
Prof. Proust.
Prof. Chantemesse.
Monsieur Ogier.
Dr. Mosny.
Dr. Bordas.
Dr. Josias.
Monsieur Mourier.
Monsieur Felix Voisin.
Monsieur Heppenheimer.

Le Ministère de l'Instruction Publique et des Beaux Arts.
Dr. Ollive.

Le Comité Consultatif d'Hygiène Publique.
Dr. Jules Ogier.

Le Ministère de la Marine.
Dr. Ch. Auffret, Hon. V.P.

Société de Préservation contre la Tuberculose.
Dr. Barbary.

Les Chemins de fer de l'Etat.
Dr. Redard.

Conseil d'Hygiène Publique et de Salubrité du Département de la Seine.
Dr. Bordas.
Dr. Albert Josias.
M. Nocard, Hon. V.P.
Dr. Thoinot, Hon. V.P.

FRANCE—continued.

Conseil Municipal de Paris.
Dr. Chérot.
M. Colly.
M. Houdé.
M. Lepelletier.
M. Morel.
M. Ransom.
M. Ambroise Rendu.

L'Académie de Médecine.
Prof. Brouardel, Hon. V.P.
Prof. Landouzy, Hon. V.P.
Prof. Lannelongue, Hon. V.P.
Prof. Robin.

La Société de Biologie.
Prof. Bouchard, Hon. V.P.
Prof. Dupuy.
Prof. Landouzy, Hon. V.P.

La Société Médicale des Hôpitaux de Paris.
Dr. Béclère.
Dr. Faisans.
Dr. Galliard.
Dr. Launois.
Dr. Letulle, Hon. V.P.
Dr. Troisier.

L'Université de Nancy.
Prof. Paul Spillmann.
Prof. Louis Spillmann.
Prof. Haushalter.

L'Université de Bordeaux.
Dr. Arnozan.
Dr. Hobbs.
Dr. Lalesque.

Ligue Française contre la Tuberculose.
Dr. Armaingaud, Hon. V.P.
Dr. Lasalle.

Société des Anciens Médecins des Armées de terre et de mer.
Dr. Baradat.

L'Œuvre de la Tuberculose Humaine.
Dr. Gustave Bernard.
Dr. Samuel Bernheim.

La Faculté de Médecine de Bordeaux.
Dr. H. Arnozan.

"*La Médecine Moderne.*"
Dr. Hobbs.

GERMANY.

Imperial Government.
Prof. Dr. Gerhardt, Berlin, Hon. V.P.
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TRANSACTIONS

OF THE

British Congress on Tuberculosis

FOR THE PREVENTION OF CONSUMPTION.

LONDON, JULY 22nd to 26th, 1901.

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HIS MAJESTY THE KING.

President:
FIELD-MARSHAL H.R.H. THE DUKE OF CAMBRIDGE, K.G.

VOLUME II.

REPORT OF THE STATE SECTION.

EDITED BY H. TIMBRELL BULSTRODE, M.D.,
Honorary Secretary of the Section.

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Vice-Presidents.

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The Rt. Hon. The LORD PROVOST OF EDINBURGH.
The Rt. Hon. THE LORD MAYOR OF DUBLIN.
THE LORD PROVOST OF GLASGOW.
THE LORD MAYOR OF LIVERPOOL.
THE LORD MAYOR OF MANCHESTER.
THE LORD MAYOR OF BIRMINGHAM.
THE LORD MAYOR OF LEEDS.
THE LORD MAYOR OF YORK.
THE LORD MAYOR OF BRISTOL.
THE LORD MAYOR OF BELFAST.
Sir HERBERT ASHMAN (ex-Lord Mayor of Bristol).
Sir CHARLES CAMERON, C.B. (Medical Officer of Health of Dublin).
W. J. CROSSLEY, Esq. (Manchester).
Sir HENRY LITTLEJOHN, M.D. (Edinburgh).
SHIRLEY F. MURPHY, Esq. (County Medical Officer of Health of London).
WILLIAM HENRY POWER, Esq., F.R.S. (Medical Officer of the Local Government Board of England and Wales).
Dr. ARTHUR RANSOME, F.R.S. (Bournemouth).
Dr. J. B. RUSSELL (Medical Officer of the Local Government Board of Scotland).
Dr. STAFFORD (Medical Commissioner of the Local Government Board of Ireland).
Dr. PAGET TOMLINSON (Westmoreland County Council).

Hon. Secretaries.

Dr. BULSTRODE (Local Government Board, Whitehall, London).
Dr. NEWSHOLME (Town Hall, Brighton).
Dr. NIVEN (Town Hall, Manchester).

FIRST DAY, TUESDAY, JULY 23RD.

ST. GEORGE'S HALL.

The PRESIDENT, the Right Hon. SIR HERBERT MAXWELL, Bt., M.P., F.R.S., in the Chair.

Dr. BULSTRODE (Joint Hon. Secretary), in introducing the Chairman to the meeting, said: The proceedings of this Section will now be opened by a short address from Sir Herbert Maxwell. It is quite superfluous for me to remind you of the great interest which Sir Herbert Maxwell takes in all questions of tuberculosis and in all matters relative to the public health. He was Chairman of the Second Royal Commission upon Tuberculosis, and he is at the present time Chairman of at least two Departmental Committees connected with public health questions. Probably many of you know some of the admirable works of fiction which have emanated from Sir Herbert

Maxwell's pen, as also his numerous writings upon natural history, and I think it is quite unnecessary for me to say anything in order to accord him a most hearty welcome at your hands. (Cheers.)

THE PRESIDENT'S ADDRESS.

LADIES AND GENTLEMEN,—There is no one, I am sure, in this room who could feel more his own unfitness for discussing the matters which are to be brought under the consideration of this Congress by those specially trained in that province of thought than I am. Being myself wholly without professional training, I trust that you will regard me only in the light of a link between the domain of scientific research and that legislative machine which it is the object of men of science to set in motion. We sometimes hear complaints, especially in this country, that the Legislature does not keep abreast with the advance of science. I would remind you that men of science must be in a great measure pioneers. Pioneers have to retrace their steps sometimes, but for the legislator it is written, *Vestigia nulla retrorsum.* That is why we appear to be laggard in the advance.

But however unfit I am to discuss these subjects, there is one thing which at all events I may venture to do, and that is to bid a hearty welcome to those ladies and gentlemen who have travelled, many of them from foreign countries, and others from our own provinces, in order to take part in the business of this great Congress. In one respect I am afraid our welcome to our foreign guests must partake of the nature of an apology. Those who were present at the great Congress in Berlin in 1899 must cherish a warm recollection of their reception there, the princely hospitality displayed to them, the liberal manner in which the great building of the Reichstag was placed at our disposal for the transaction of business, and, above all, the warm personal interest displayed by the German Emperor—(cheers)—his Empress and the Ministers of State. The circumstance of mourning under which this country lies at present owing to the death of our good Queen has rendered it impossible for King Edward and his Ministers to impart to your reception in this country and in this metropolis that degree of dignity and warmth which under other circumstances would have been most natural and most fitting. I pray you therefore, gentlemen from foreign countries, to bear this in mind, and to make allowances for any shortcomings in your reception here on the present occasion. I have spoken of you as foreigners, but I do not forget that neither to science nor philanthropy are there any physical frontiers separating nation from nation; we work hand in hand in the common cause, without jealousy, though emulating one another in the search for truth, and looking for no reward save in the common welfare of humanity.

It is not unfitting, perhaps, on the threshold of your labours, that I should remind you of the vast advance that has been made in the knowledge of the specific disease with which it is the object of this Congress to deal. Scarcely a generation has passed away since that illustrious Frenchman, Dr. Villemin, first demonstrated the infectious nature of tuberculosis, and, much less than that, not more than twenty years have passed since an equally illustrious

German, Professor Koch, whose presence at this Congress is a matter of so much interest and satisfaction to us all, first isolated and specified the bacillus of that disease. We have indeed made rapid progress, but even more lies before us, and if I venture to touch upon two points which come under your consideration, it is not because I assign to them a higher importance than the other matters which will be considered, but it is because, as a plain, unprofessional man, certain points do present themselves to me which might not appear so vivid in the apprehension of others. On the paper for discussion to-day there is the great question of notification. Upon that point I would ask you to bear in mind how impossible it is to induce any educated and self-governing community to adopt restrictions and precautions unless and until they comprehend the nature of these precautions and share the understanding that they will be effective. Our experience in this country in the matter of compulsory vaccination will, I can assure you, make the Legislature extremely shy of taking any step in the direction of the control of tuberculosis unless they feel that they have the weight of public opinion behind them. I need not labour that point; it was well put by Professor Brouardel in his address yesterday in the St. James's Hall. What I ask you to bear in mind is that before you invite the people, at all events of this country, to join you in the control of disease by adopting notification, you must inform them thoroughly of the object you have in view. Let them thoroughly grasp the fact that, although the returns show that the mortality from tubercle has been diminished from thirty-eight per thousand in the year 1832 to, I think, fourteen per thousand in the year 1894, tuberculosis still remains answerable for a greater proportion of mortality in this country than all the other most dreaded infectious diseases put together. Let them thoroughly comprehend that, let them understand what has been done, and, speaking from a considerable knowledge of my own countrymen, I venture to say that no insuperable difficulty will be found in the way of notification of disease.

There is only one other point, and I scarcely like to take up your time by alluding to it, because it is a minor point. It is in connection with the subject of to-morrow's paper—"The Influence of Housing and Aggregation." We are all, of course, of one mind in regard to cleanliness and the better housing of the poor in great cities, but there is one point in our great cities which is apt to be overlooked. "Dust thou art," says the Scripture, "and unto dust thou shalt return"; and in our praiseworthy efforts to delay that return as long as possible we have come inevitably to the conclusion that there is no more potent agency in the dissemination of disease than dust itself, and no such potent agency in sterilising that dust as abundant sunlight. My point is this—that while we have spent large sums of money and great attention in bettering the houses of the working classes, we are face to face with what seems to me a danger in this city, where, as in other great commercial centres, land is measured by so many guineas the square foot. Where land becomes of great value the tendency is to pile up houses higher and higher, and so exclude that priceless agent, the sunlight. I think it is worth the attention of municipalities and other governing bodies

some proportion should not be imposed upon architects and builders of the heights of their houses to the width of the street.

Now, ladies and gentlemen, I have said enough for an ignorant man. Many subjects will come under your consideration for discussion, and I anticipate most valuable and practical results from the conclusions to which you will come. You have got to consider and advise what part the State and the Municipality is to bear in putting into practical effect the discoveries of science. I have a somewhat distasteful duty to discharge, and that is to remind you that we work under the inexorable limits of time, and that I must invite your co-operation, not only by confining your remarks to reasonable dimensions, but also concentrating them upon the subject of the various Papers. (Cheers.)

DIVISION I.

PART I.

NOTIFICATION OF TUBERCULOSIS.

DR. NEWSHOLME (Honorary Secretary) read the following letter from Dr. Hermann Biggs, of New York, U.S.A., who was to have opened the discussion upon the following subject: "How can the voluntary notification of advanced tuberculosis be best encouraged and effected, and what has been the experience of compulsory notification in the States of New York, Buffalo, and Washington?"

5, WEST FIFTY-EIGHTH STREET.

MY DEAR DR. BULSTRODE,—At the last moment I find that I am not able to go to England for the Congress because of illness in my family. Fortunately, however, Dr. E. G. Janeway, who was formerly Commissioner of Health of New York City, and who is an Hon. Vice-President of the Congress, has offered to present my paper for me. Dr. Janeway is one of the most distinguished men in America in medicine; he is Dean of the Medical Faculty of the New York University and Professor of Medicine. He is perfectly familiar with all of the sanitary work in New York, and is far more competent to speak than I am. I think he may be not as well known abroad as here, as he writes little, but he and Dr. Osler are easily the leaders in American medicine. I write this that you may know the character of the man.

Thank you very much for your cable received yesterday. It is a great disappointment to me to be obliged to give up the Congress, but has seemed to be impossible for me to leave.

With many thanks to you, and hoping that the arrangement for Dr. Janeway to take my place will be satisfactory, I am, Very sincerely,

HERMANN M. BIGGS.

July 12th, 1901.

Professor JANEWAY (New York): Mr. President, Ladies and Gentlemen,—Professor Biggs is very sorry that he is not able to come here to-day to take part in this Congress, and as I was coming over as a delegate I promised I would present the paper for him.

"The Notification of Tuberculosis in New York City and its Results." By Hermann M. Biggs, M.D., *Pathologist and Director of the Laboratories, Department of Health, New York City; Professor of Therapeutics and Clinical Medicine, University and Bellevue Hospital Medical College.*

Sanitary regulations providing for the voluntary or compulsory notification of pulmonary tuberculosis have been in force in several of the cities and States of the United States since 1893, although even now only a comparatively small number of the municipal and State authorities have adopted any procedures with relation to this disease.

The authorities of New York City were the first among the municipal authorities of the United States, and, I believe, were the first in the world to adopt, in February, 1894, a scheme of notification which was at first partly voluntary, but later made compulsory. In the latter part of 1893, preceding

by a few months this action in New York City, the health authorities of the State of Michigan, which has always been foremost in its sanitary work, adopted a somewhat similar plan. More recently Buffalo, San Francisco, Philadelphia, and some of the smaller towns and cities throughout the United States have followed the example, and have passed regulations requiring the compulsory notification of this disease. In a few other cities provisional schemes for voluntary notification have been adopted. As more has been accomplished in this matter in New York City than elsewhere in the United States, a brief historical *résumé* of the work there and its results may be of interest.

The first official action of the Board of Health of the City of New York in relation to pulmonary tuberculosis was taken in 1889, when a resolution was passed by the Board asking the consulting pathologists of the Department for a report on the causation and prevention of this disease. In the communication on this subject submitted to the Board in response to this resolution special emphasis was laid upon the following points:—

First, tuberculosis is a distinctly preventable disease.

Second, it is not directly inherited.

Third, it is acquired by the direct transmission of the tubercle bacillus from the sick to the well, usually by means of the dried and pulverised sputum suspended as dust in the air.

The measures then suggested for its prevention were: *First*, the security of the public against the use of tuberculous meat and milk by a system of rigid official inspection of cattle; *second*, the dissemination among the people of the knowledge that every tuberculous person may be a source of actual danger to his associates if the discharges from the lungs are not immediately destroyed or rendered harmless; *third*, the careful disinfection of rooms in private houses and of hospital wards which are occupied or have been occupied by tuberculous patients.

After consulting with numerous prominent physicians in New York, the Board of Health finally decided that the medical profession and the people were not then prepared for the adoption of active preventive measures based on a belief in the infectious nature of tuberculosis. It was therefore determined to adopt the first and second suggestions contained in the pathologists' report, *i.e.*, to protect the meat and milk supplies by inspection, and to disseminate information among the people as to the communicable nature of this disease. Circulars of information on this subject were prepared and widely distributed, especially among the tenement-house population, and certain measures were adopted in regard to the recording of houses in which tuberculous patients had died. This action was taken in 1889. Nothing more was done by the Department until the winter of 1893 and 1894, when, upon the recommendation of the writer, certain resolutions were passed by the Board and at once put into effect. These resolutions read essentially as follows:—

First, "The Department of Health will hereafter register the name, address, sex, and age of every person suffering from tuberculosis in New York City, so far as such information can be obtained, and requests that all physicians

forward such information on postal cards supplied for this purpose by the Department."

It was announced by the Board in this connection that the data thus obtained would be used only for the information of the Department, and in no instance would visits be made by inspectors of the Department unless the tuberculous person resided in a tenement house, boarding-house, or hotel, or unless the attending physician requested that an inspection be made and in no case where the tuberculous person resided in a tenement house, boarding-house, or hotel would action be taken if the physician sending the notification requested that no visits be made by the inspectors, and signified his willingness to deliver circulars of information regarding the causation and prevention of tuberculosis, or give equivalent information to the patient or friends.

Second, "The *authorities of all public institutions*, such as hospitals, dispensaries, asylums, prisons, homes, etc., will hereafter be required to furnish to the Department the name, sex, age, occupation, and last address of every consumptive coming under observation within seven days of such time."

Third, "When the Department obtains knowledge of the existence of cases of pulmonary tuberculosis residing in tenement houses, boarding-houses, or hotels, inspectors will visit the premises and family, will leave circulars of information, and instruct the person suffering from consumption, or the family, as to the measures which should be taken to prevent the spread of the disease, and, if it is considered necessary, will make such recommendations for the cleansing or renovation of the apartment as may be required."

Fourth, "In all cases where it comes to the knowledge of the Department that premises which have been occupied by a consumptive have been vacated by death or removal, an inspector will visit the premises, and direct the removal of the infected articles, such as carpets, rugs, bedding, etc., for disinfection, and will make such written recommendations to the Board as to the cleansing and renovation of the apartment as may be required. An order embodying these recommendations will then be issued on the owner of the premises, and compliance with this order will be enforced. No persons other than those there residing at the time will be allowed to occupy such apartments until the order of the Board has been complied with. Infected articles, such as carpets, rugs, etc., will be removed by the Department, disinfected and returned, without charge, to the owner."

Fifth, "For the prevention and treatment of pulmonary tuberculosis, it becomes of vital importance that a positive diagnosis of the disease be made at the earliest possible moment; and that the value of bacteriological examinations of the sputa for this purpose may be at the service of physicians in all cases not under treatment in hospitals, the Department is prepared to make such examinations, if samples of the sputa, freshly discharged, are furnished in clean, wide-necked, well-stoppered bottles, accompanied by the name, age, sex, and address of the patient, duration of the disease, and the name and address of the attending physician. Bottles for collecting sputa, with blank forms to be filled in, may be obtained at any of the pharmacies now used as stations for the distribution and collection of serum tubes for

diphtheria cultures. After the sputum has been obtained, if the bottle, with the accompanying slip filled out, is left at any one of these stations, it will be collected by the Department, examined microscopically, and a report of the examination forwarded to the attending physician free of charge."

Circulars of information describing the measures adopted were forwarded to every physician in New York City, and circulars for the information of consumptives and those living with them were also prepared and printed in English, German, Italian and Hebrew. These latter were widely distributed, especially in the tenement-house districts.

During the first year after the beginning of this work, 4,166 cases of tuberculosis were reported to the Department of Health; during the second year, 5,824; and during the third year (1896), 8,334.

During these years the apartments in the tenement-house districts, where the notified cases resided, and also those in which deaths from tuberculosis occurred, the latter numbering each year nearly 5,000, were, so far as possible with the force of inspectors at hand, inspected, and the consumptives and their families were instructed as to necessary precautions. Premises vacated by death or removal, where the conditions seemed to require it, were placarded to prevent reoccupancy, and orders were served on the owners requiring their renovation. In some cases, bedding, carpets, etc., were removed and disinfected.

During the latter part of 1896 a further communication on this subject was presented to the Board by Dr. T. M. Prudden and the writer, recommending that still further action be taken. In this communication it was shown that great progress had been made during the three years following the adoption of these resolutions; that information in regard to the nature of pulmonary consumption, and the methods of its transmission, had been widely disseminated, both among the better classes and the tenement-house population; that the reports from the inspectors showed that the communicable nature of the disease was generally understood by the better-educated portion of the tenement-house population, and that some precautions were being observed in nearly one-half of the cases, when the first inspections were made.

It was further pointed out that great obstacles had been met in carrying on the work owing to the lack of proper facilities for the care of persons suffering from pulmonary tuberculosis, who, because of their ignorance or poverty, or the peculiar nature of their occupation, were specially dangerous sources of infection. The following recommendations then made were adopted by the Board of Health, January 12th, 1897:—

1. That such action be taken by the Health Board as seems necessary and proper to at once secure the provision of hospital accommodation, under its charge, for the care of the poor suffering from pulmonary tuberculosis, who, as active sources of danger to the community, may properly come under its supervision.

2. That an amendment be made to the Sanitary Code declaring that tuberculosis be officially considered a *communicable* disease, and formulating regulations under which its sanitary surveillance shall be exercised.

3. That all institutions in this city which admit and treat cases of pulmonary tuberculosis be subjected to regular and systematic inspection by officials of this Board, and that specific regulations be established for the conduct of such institutions, in accord with the proposed amendment to the Sanitary Code.

4. That the scope of the measures designed for the education of the people in regard to the nature of pulmonary tuberculosis, and the methods to be taken for its prevention, be enlarged, and a closer sanitary supervision be maintained over individuals suffering from this disease in the densely populated tenement districts and in the crowded workshops and public buildings of this city.

On January 19th, 1897, in pursuance of the determination to put these recommendations into effect, the Board of Health passed the following ordinance :*—

> "RESOLVED,—That pulmonary tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in this city to report to the Sanitary Bureau in writing the name, age, sex, and occupation and address of every person having such disease who has been attended by or who has come under the observation of such physician for the first time, within one week of such time. It shall also be the duty of the commissioners or managers, or the principal, superintendent, or physician of each and every public or private institution or dispensary in this city, to report to the Sanitary Bureau in writing, or to cause such report to be made by some competent person, the name, age, sex, occupation and last address of every person afflicted with this disease who is in their care or who has come under their observation within one week of such time. It shall be the duty of every person sick with this disease, and of every person in attendance upon anyone sick with this disease, and of the authorities of public or private institutions or dispensaries, to observe and enforce all the sanitary rules and regulations of the Board of Health for preventing the spread of pulmonary tuberculosis."

Later in the year the Board made application to the Board of Estimate and Apportionment for a special annual appropriation of $60,000, to be used for the care of persons suffering from pulmonary tuberculosis, who might be sent to private institutions by the Board, the compensation to such institutions for the care of these cases to be at the rate of one dollar per day. This appropriation was granted for the year 1898, but in subsequent years it has been somewhat reduced in amount.

It should be noted in this connection that the sanitary authorities of New York have always attempted to formulate their action in relation to tuberculosis entirely upon rational grounds, quite independently of the measures

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* The Board of Health of New York City has legislative powers, as well as executive and judicial.

adopted and carried out with reference to those diseases properly regarded as contagious. Previous to the adoption, in January, 1897, of the ordinance requiring the notification of this disease, eight years had elapsed since the first action of the Department, during which means had been taken to educate the people and the medical profession as to the nature of the disease.

The ordinance did not require the reporting of all cases of tuberculosis, but only of the cases of pulmonary tuberculosis—those which are likely to be communicable, and therefore dangerous. Furthermore, pulmonary tuberculosis was not placed in the class of contagious diseases, which includes measles, scarlet fever, small-pox, etc., but was treated alone, in a special section of the Sanitary Code, and declared to be a "communicable disease, dangerous to the public health." The difference between pulmonary tuberculosis and the contagious diseases was especially emphasized in the circulars of information.

It seems to me that the difficulties in dealing with this disease have been greatly increased because of the failure of sanitary authorities generally to recognise this distinction. Both to the public and to the medical profession the term "contagious" conveys a distinct conception of the ready transmission of disease from the sick to the well after slight exposure. This is certainly not true of tuberculosis.

Since the ordinance was passed, the Department of Health has not endeavoured to enforce strictly the regulations requiring the notification of cases occurring in private practice. It was not the intention to do so when it was enacted. The Board has not prosecuted physicians who have failed to report cases, and is well aware of the fact that many cases are not reported; nevertheless, constant progress is being made. The attention of physicians who report deaths due to tuberculosis, in cases which have not been previously notified, is called by special letter to the provision of the Sanitary Code requiring the reporting of such cases, and they are asked for an explanation of the failure to report the case.

The superintendents of public institutions are constantly reminded of their obligations in this matter, and usually twice a year a census is made of all the cases under care in all the public institutions in the city.

It may be urged that as the regulations in regard to notification are not strictly enforced, it cannot be said that the system is compulsory. This criticism has force, but it should be noted that a very large number of cases are reported; that the number is constantly increasing, and that the enforcement of the regulations is generally being made more stringent.

It does not seem to me that there has been one single valid objection advanced to a rational system of notification, and no other method can be devised, so far as I can see, which will give the required information regarding the cases residing in tenement houses, lodging-houses, hotels, boarding-houses, etc. It would be undemocratic, and probably illegal, to enforce the notification of cases living under certain conditions, as in tenements, and to exclude those living under other conditions, as in private houses, but the sanitary authorities may use their discretion as to the measures which shall be adopted under varying conditions, depending upon the danger which they conceive exists as far as the public is concerned. As a matter of fact, in private houses no action

is taken, excepting as to registration. This position is assumed and conditioned upon the medical attendant giving such information as is necessary to the patient in regard to the means for the prevention of the disease.

A large number of cases are reported through the examinations of sputum; and a curious feature presented is this—that physicians who object to reporting cases of tuberculosis will send specimens of sputum for examination with the data which constitute a report. The total number of examinations of sputum during the year 1901 will be about 7,000, and the results in about 3,000 of these will be positive. Thus 3,000 cases from private practice will be reported during the present year.

In order that tuberculosis shall be properly dealt with by the sanitary authorities, it is necessary that the sanitary supervision in every municipality shall comprise (1) compulsory notification; (2) suitable plans for the education of the people, including the visitation and instruction of cases, especially those residing in tenement houses, lodging-houses, boarding-houses and hotels; (3) a complete and efficient scheme for the disinfection or renovation of premises vacated by death or removal; (4) the supervision of shops, occupations and conditions where consumptives are employed; (5) a hospital equipment, consisting of a reception pavilion for tuberculous patients, a suitable institution within or near the municipal limits, for the care of advanced cases, and a country sanatorium in a well-situated locality for the care of incipient cases; (6) the power of compulsory removal and retention of patients in a hospital when necessary, in the same manner as is practised in the contagious diseases. In only rare instances would the exercise of this power be required, but occasions sometimes present themselves in which such action is necessary. The following is one of a number of instances which have come under my observation.

The owner of a sweat-shop in a tenement-house district was found to be suffering from advanced pulmonary tuberculosis. He employed in his work-rooms, which were close and badly ventilated, a considerable number of young women. He was excessively filthy in his habits, and refused to follow directions given in regard to the care of his expectoration, and persisted in spitting on the floor, wall, or anywhere that was convenient. I should unhesitatingly favour the forcible removal of such a patient by the sanitary authorities. It may be said, however, that if the power for forcible removal was possessed by the authorities it would rarely be necessary to exercise it.

Let us consider for a moment what registration has already shown in New York as to the nature and the extent of the problem with which we have to deal. At the beginning of this work in New York City in 1894, I had prepared sectional maps of the city, showing every house-lot in the boroughs of Manhattan and The Bronx, on a scale large enough so that reported cases and deaths could be plotted in each house-lot by conventional signs, which indicate the month and year of the report. From these maps I have selected a few blocks in which the largest number of cases has occurred, and had them reproduced. On these maps each case reported is indicated by a dot. These show that on a single street-block as many as 102 cases have been reported within a period of 4¼ years, and as many as 24 cases in a sing-

house.* For example, on the block on Cherry Street, between Pearl and Roosevelt, 102 cases came to the notice of the Department from April, 1894, when this work was begun, to January 1, 1899. The population of this block in January, 1900, as enumerated by the sanitary police, was 1,165. On another block, bounded by Cherry, Market, Catherine and Monroe Streets, there were 241 cases of tuberculosis, with a population of 3,688. In a third one, which includes particularly the Chinese quarter, bounded by Chatham, Mott, Bayard Street and the Bowery, there were 206 cases, with a population of 2,102. These districts represent perhaps the worst conditions existing in the city, but the number of cases in many others nearly approximates the number found in these. Throughout the tenement-house districts everywhere large numbers of cases have been reported. I presume we must add to these numbers at least one-half more to cover the unreported cases, for I do not believe more than two-thirds of the cases in Manhattan and The Bronx have until recently been reported.

With a problem of such magnitude as is here presented, how are the authorities to obtain information in regard to the cases without compulsory notification? And without knowledge, how can they hope to deal with any measure of success with the existing conditions? I have never heard those who object to registration suggest any practical alternative, and I believe there is none to be found. It may be said that such conditions as have been described do not exist outside of New York City. But no one can foresee what will be found in any city until the cases are registered, and I have no doubt that conditions approximating those present in New York City would be found in every large city, for the tuberculosis death-rate is much below that of many other great cities.

The following table shows the number of cases of tuberculosis reported to the Department of Health during the years 1894 to 1900 inclusive, and from January 1st to July 1st of the present year:—

	1894 . . .	4,166 cases.
	1895 . . .	5,826 „
	1896 . . .	8,334 „
	1897 . . .	9,735 „
	1898 . . .	9,471 „
	1899 . . .	8,877 „
	1900 . . .	11,997 „
From January 1st to July 1st . .	1901 . . .	7,325 „

Until January, 1898, reports were from the boroughs of Manhattan and The Bronx, which constituted until that time New York City. Since January, 1898, reports are for Greater New York.

There was comparatively little increase in the number of reported cases during the years 1898 and 1899, because no measures had been adopted in the boroughs of Brooklyn, Queens, and Richmond in relation to pulmonary tuberculosis previous to the consolidation, and during these years but few

* Such a tenement house may have 150 or more occupants.

cases were reported; and further, because during the first three years *all* reported cases were included in the reports, and, subsequent to January 1st, 1898, the duplicates were excluded. These each year have varied between 1,500 and 3,000.

It is to be noted that, if the rate of increase during the first six months of 1901 is maintained for the present year, reported cases for the city will nearly equal 15,000.

The annual deaths from all tubercular diseases in New York City average a little more than 9,000.

Statistics relating to Phthisis and other Tuberculous Diseases, 1875–1899, inclusive.

Year.	Total deaths, all causes.	Deaths Phthisis.	Other Tuberculous.	Total Tuberculous Deaths.	Per cent. of Tuberculous on Total Deaths.	Death-rate Phthisis.	Death-rate all Tuberculous.
			Boroughs of Manhattan and The Bronx.				
1875	30,709	4,172	773	4,945	16·10	3·99	4·73
1876	29,152	4,194	776	4,970	17·05	3·90	4·62
1877	26,203	4,044	647	4,691	17·90	3·65	4·24
1878	27,008	4,466	721	5,187	19·21	3·92	4·55
1879	28,342	4,343	728	5,071	17·89	3·70	4·32
1880	31,937	4,706	736	5,442	17·05	3·89	4·50
1881	38,624	5,312	811	6,123	15·85	4·27	4·92
1882	37,924	5,247	805	6,052	15·96	4·10	4·72
1883	34,011	5,290	653	5,943	17·47	4·01	4·51
1884	35,034	5,235	804	6,039	17·28	3·86	4·45
1885	35,682	5,196	749	5,945	16·66	3·72	4·26
1886	37,351	5,477	872	6,349	16·99	3·81	4·42
1887	38,933	5,260	747	6,007	15·43	3·56	4·06
1888	40,175	5,260	813	6,073	15·12	3·46	3·99
1889	39,679	5,179	862	6,041	15·22	3·30	3·86
1890	40,103	5,492	917	6,409	15·98	3·41	3·97
1891	43,659	5,160	949	6,109	13·99	3·11	3·56
1892	44,329	5,033	1,028	6,061	13·67	2·95	3·55
1893	44,486	5,124	1,039	6,163	13·85	2·91	3·51
1894	41,175	4,658	1,062	5,720	13·89	2·57	3·16
1895	43,420	5,205	1,078	6,283	14·47	2·78	3·35
1896	41,622	4,994	932	5,926	14·24	2·62	3·11
1897	38,877	4,843	948	5,791	14·89	2·50	2·98
1898	40,438	4,957	944	5,901	14·59	2·51	2·99
1899	39,911	5,238	971	6,209	15·56	2·60	3·08
1900	43,227	5,278	901	6,179	14·29	2·57	3·01
			Greater New York: Boroughs of Manhattan, Bronx, Queens, Richmond and Brooklyn.				
1898	66,294	7,724	1,541	9,265	13·97	2·25	2·69
1899	65,344	8,016	1,559	9,575	14·65	2·26	2·70

There has been a reduction in the mortality from the tuberculous diseases in New York City since 1886 of more than 30 per cent., and I have no hesitation in saying in conclusion that I believe, with a complete and efficient scheme for dealing with pulmonary tuberculosis, including suitable hospital accommodation and the proper enforcement of precautionary measures, the death-rate from the tuberculous diseases in New York City may be further reduced one-third within a similar period. This would mean the saving of 3,000 lives annually. Notification in some form seems to me a logical necessity and a necessary preliminary to the adoption of other measures for the prevention of this disease.

I desire to express my warm sense of personal obligation for the opportunity of contributing to this discussion, and to assure the members of the Section that only illness in my family prevented my attending the Congress in person. My regret is somewhat less keen, however, in that Dr. Janeway, a most distinguished ex-Commissioner of the Department of Health, and an Honorary Vice-President of this Congress, has consented to present this paper for me.

Professor OSLER (Baltimore): It gives me a great deal of pleasure to rise and move a vote of thanks to Dr. Biggs for his most valuable communication, and to Dr. Janeway for his kindness in reading it. Probably few here know the conditions under which the Health Board of New York has worked these many years, the difficulties they have had to contend with of overcrowding in the enormous tenement houses which exist in that city, the difficulties they have had to deal with in manipulating Tammany. I would ask any of you who are interested in this question of compulsory registration to read the reports of the city of New York for the past six or eight years. They form an object-lesson on this work, which is of the greatest practical value to the communities, not only in the United States, but to cities throughout the world. It gives me the greatest pleasure to move this vote of thanks to Dr. Biggs.

The Chair was here vacated by Sir Herbert Maxwell and taken by Sir James Crichton-Browne, F.R.S.

"On the Notification of Phthisis as Carried Out in the City of Manchester." By Alderman McDougall, *Deputy Chairman of the Sanitary Committee and Chairman of the Hospital Sub-Committee in Manchester.*

The community of this city has received a considerable amount of preparation for the introduction of what may be called direct administrative measures dealing with the prevention of tuberculosis.

The publication of Koch's discovery of the tubercle bacillus in 1882 and the demonstration of its presence in greater or less abundance in the discharges from tuberculous persons, particularly in the expectoration of phthisical people, taken along with the demonstration of its prolonged viability in sputum by Schill and Fischer, indicated that the usual channel of infection must be the dust derived from dried expectorated matter.

Hence, even before Dr. Cornet made his classical inquiry into the

infectivity of the dust in houses inhabited by consumptive persons, it was possible to frame useful instructions for the guidance of consumptive persons. In 1898, after the publication of Cornet's research, however, additional certainty and precision was given to popular instruction. At this period the physicians of the Manchester Hospital for Consumption began a systematic instruction of their patients, both orally and by handbill, a procedure which has since been maintained.

In 1892 and 1893 the prevention of tuberculosis received prolonged consideration from the North-Western Branch of the Society of Medical Officers of Health, consideration which resulted in a programme of preventive action being laid before the General Society—a programme which still holds good, though it may not be immediately attainable.

From 1894 onwards the Corporation of Manchester have caused handbills to be issued on three occasions to every house in the city, giving directions for precautionary measures.

As a result, also, of the deliberations of the North-Western Branch of the Society of Medical Officers of Health, similar action has been taken in other towns.

When, therefore, in 1899 a scheme of voluntary notification of phthisis was submitted by the Sanitary Committee, the City Council was sufficiently well acquainted with the subject to be able to arrive at the conclusion that the scheme should be tried.

Not only, however, was the public mind in Manchester prepared for an effort in this direction, but the city of New York had actually adopted in the end of 1893 a scheme of voluntary notification, passing on in 1897 to compulsory notification.

It is questionable whether this order should not, for the present, be observed in every case, since there are many difficulties to be overcome and many adjustments to be made, which can be met under a voluntary scheme, but which might wreck compulsory notification.

The objects which it was proposed to attain by voluntary notification were these:—

1. To educate the members of a household which had been invaded by consumption, not merely by printed instructions, but orally, in the precautions requiring to be carried out.

It was felt that only medical men could accomplish this work, and the scheme provided, therefore, for the appointment of highly qualified medical assistants to the Medical Officer of Health.

2. To carry out the measures of disinfection needed to remove the infective matter already deposited in the houses.

Supposing it is desired to render a phthisical person innocuous, it is clear that two separate considerations present themselves—how to induce and enable him to take such personal precautions that he will no longer be a source of infection, and how to destroy the effect of the tuberculous discharges which have been already deposited by him.

Neither problem is quite simple. But both require solution.

contains particulars relating to the duration of illness, the pied by the consumptive during and for some time before his menced, the condition of the house now occupied, the family e exposure to infection from relatives, companions or work-fellows, rs of occupation and personal habits, the precautions already the results of examination of sputum, the instructions given by the tant Medical Officer, and the measures of disinfection or cleansing uired.

The Assistant Medical Officer visits the home of the patient and fills in his form.

The further administration is effected by using part of the services of the twenty-eight Sanitary Inspectors attached to the Sanitary Department of the City, and by using part of the services of the nineteen Health Visitors belonging to two voluntary organisations, viz., the Manchester and Salford Ladies' Health Society and the Jewish Ladies' Health Society, which are aided by the City Council.

If the disinfection required is to be carried out by the Sanitary Authority, a Sanitary Inspector visits and fills in a form showing precisely what rooms and articles are to be disinfected.

This form is transmitted to the disinfecting department and to the officer who is to superintend the disinfection.

In the central parts of the town a visitor of one of the Ladies' Health Societies attends the disinfection, notes the time spent in disinfection, observes the procedure adopted, and enters up the details. In the outer ring the control is by means of the Sanitary Inspectors.

When a house or part of a house has to be cleansed by the Sanitary Authority for phthisis, a request is addressed to the property owner to allow the necessary disinfection to be carried out, a request which is almost invariably readily complied with. It is true the Sanitary Authority could require such cleansing to be carried out under a Local Act obtained in 1844, but it is considered desirable to have these measures executed with the good-will of the landlord. When, in the judgment of the Assistant Medical Officer, the disinfection of the walls may be adequately effected by means of dough, the process of cleansing the rooms is supervised, as far as possible, by a Sanitary Inspector or a Health Visitor. In the case of deaths from phthisis of persons not notified to the Health Office, no visit has hitherto been paid by the Medical Officers, but the Sanitary Inspector or Health Visitor in whose district the death has occurred visits the house and arranges the mode and extent of disinfection.

Disinfection is also carried out in all houses or rooms so soon as it is known that they have been vacated by a phthisical person, and generally we become aware of such cases through our system of monthly visits, so far as notified persons are concerned.

In all cases full particulars are obtained on a printed form of the work of cleansing and disinfection which has been actually carried out, either by the Sanitary Authority or by the people themselves.

3. To collect data for further action.

Such data would embrace the effects of occupation, the evidence of prolonged exposure to infection, the influence of infected houses and places in the propagation of the disease, the degree of necessity for the provision of sanatoria or isolation hospitals for advanced cases, the possibility of selecting cases for removal to hospital so as to produce a maximum of effect in reducing the disease, and other important matters.

4. If possible, to maintain some supervision over consumptives, with a view to secure the continued application of precautionary measures.

5. To further the introduction of proper hospital treatment.

In the scheme presented to the Corporation it was indicated that three medical men would probably be required to make the necessary visits and reports.

It was felt, however, that it would be better at first to ascertain the difficulties and the methods by which they could be overcome, by limiting the number of cases notified, and accordingly only one medical assistant, viz., Dr. Coates, was appointed in September, 1899, notifications being at first invited only from public institutions. In February, 1900, notifications were invited from private practitioners, and Dr. McCleary, now Medical Officer of Health for Battersea, was appointed as junior assistant to the Medical Officer of Health.

The administrative action taken follows closely the lines laid down in the Report of the Medical Officer of Health presented so the Sanitary Committee early in 1899.

Of this action I will first give a summary.

I will then proceed to discuss the results arrived at so far, which embrace :—

(1) The methods of dealing with infected houses.

(2) The advance made so far in facilitating the application of personal precautions.

(3) The means by which consumptive persons are kept under observation.

(4) The question of hospital provision.

(5) The evidence obtained of direct infection.

(6) The evidence as regards the infectivity of houses.

(7) Questions relating to occupation and personal habit.

(8) Matters of importance in carrying out the administration of notification.

Administrative Summary.

When a case of phthisis is notified to the Medical Officer of Health, a clerk specially allocated to this work enters the name and address in two books, one arranged according to name, and the other according to addresses. In this way it is easy to see whether a case has been previously reported, and also to trace successive occurrences of phthisis in the same house or in adjoining houses. He also enters the name and address on a printed inquiry form, which he hands to the Assistant Medical Officer.

This form contains particulars relating to the duration of illness, the houses occupied by the consumptive during and for some time before his illness commenced, the condition of the house now occupied, the family history, the exposure to infection from relatives, companions or work-fellows, particulars of occupation and personal habits, the precautions already taken, the results of examination of sputum, the instructions given by the Assistant Medical Officer, and the measures of disinfection or cleansing required.

The Assistant Medical Officer visits the home of the patient and fills in this form.

The further administration is effected by using part of the services of the twenty-eight Sanitary Inspectors attached to the Sanitary Department of the City, and by using part of the services of the nineteen Health Visitors belonging to two voluntary organisations, viz., the Manchester and Salford Ladies' Health Society and the Jewish Ladies' Health Society, which are aided by the City Council.

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Disinfection is also carried out in all houses or rooms so soon as it is known that they have been vacated by a phthisical person, and generally we become aware of such cases through our system of monthly visits, so far as notified persons are concerned.

In all cases full particulars are obtained on a printed form of the work of cleansing and disinfection which has been actually carried out, either by the Sanitary Authority or by the people themselves.

One object set forth in the scheme of notification was the paying of periodic visits to the consumptive household, with a view to ascertain that the personal precautions recommended were duly observed and that the houses were kept strictly clean. This object has been strenuously pursued.

An endeavour is also made to secure cleansing of the house every three months by the tenant, and, generally, with success.

This continued supervision is maintained in the central parts of the city by the Health Visitors of the Ladies' Health Societies, in the outer parts by the Sanitary Inspectors. Difficulty has been experienced in getting the necessary visits regularly paid, a difficulty depending chiefly on the individual visitors and on the amount of other work which they have to do. It will be seen that to carry out completely a scheme of this character requires a somewhat extensive organisation, but there can now be no doubt of its practicability or of the great amount of good done and of useful information acquired.

The number of new cases notified from September, 1899, to the end of March, 1901, was 2,338.

Of these 1,710 were notified from public institutions.

The number notified by private practitioners from March, 1900, to the end of March, 1901, has been 628.

These are entirely separate cases, and no case has been duplicated.

The cases notified from Union hospitals form a special class, inasmuch as they are often in-patients when notified, and a large number of them come from common lodging-houses or have no settled home. These notifications are necessary for administrative purposes, but do not help us in following the spread of the disease.

A list of the official forms used, and of the books, etc., kept in the office is given in Appendix I., along with the forms employed.

I will now go on to consider our administrative procedure under the heads which I have enumerated.

1. *With regard to Disinfection.*

The procedures adopted in the disinfection of houses or rooms which have been inhabited by a consumptive person have been the result of a careful consideration, partly of what was efficient, and partly of what could be attained. They have been in use for some years in connection with deaths registered as from phthisis. One mode of cleansing is founded on Esmarch's research into the cleansing of surfaces with dough ("Zeitschrift für Hygiene," Bd. ii., Heft. 3).

See also the "Medical Chronicle," 1st Series, vol. vii., p. 415.

It would appear from this research that, if only infectious dust is to be removed, cleaning with bread or dough is more effective than spraying with corrosive sublimate 1 : 1000, or a 5 per cent. solution of carbolic acid.

The other mode of disinfection is founded on an inquiry made by Professor Delépine into the applicability of a solution of chloride of lime to

the same purpose, in which he demonstrates that as regards the tubercle bacillus complete disinfection is carried out by brushing infected surfaces with a weak solution of chloride of lime—say 1½ oz. to the gallon.

See "Medical Chronicle," 1894, vol. i., New Series, p. 90, and subsequent publications.

Articles of clothing are disinfected by current steam.

A formic aldehyde chamber is now in use, in which boots, books, etc., may be disinfected.

When the Medical Officer ascertains that a consumptive person has been careful to prevent his sputum from becoming a source of infection in the house, if it is certain that no sputum can have been deposited on the walls and if the house is clean, the rooms which have been most exposed to infection are cleansed by the tenant by carefully rubbing down the walls with dough of a proper consistency, which is then collected and burned; by washing the floor, woodwork, and articles of furniture with soft soap; and by limewashing the ceiling. These operations are generally left to the tenant, and though, as far as possible, the work is actually supervised, it may be feared that it is not always fully executed and that a damp cloth is sometimes substituted for the dough with comparatively poor results. (See Esmarch, *loc. cit.*)

If, on the other hand, the house is dirty, or if the patient has not taken careful personal precautions, or if marks of sputum are observable on the floor or walls, the Corporation disinfect the surfaces with a weak solution of chloride of lime, 1½ oz. to the gallon, and with a stronger solution in special cases.

The windows are thrown wide open and the solution is then applied with Turk's head brushes to the ceilings, walls, floor and furniture, wherever dust can reach.

In cases of deaths or removals in which the house is known to be quite clean, it is disinfected by Esmarch's method by the Sanitary Authority, otherwise by chlorinated lime solution.

The actual cleansing operations carried out in houses between March 31st, 1900, and March 30th, 1901, are :—

Houses disinfected with chloride of lime by the Corporation	633
Houses in which the walls have been cleansed with lime solution.	94
Houses in which Esmarch's method has been employed to disinfect the walls, nearly always by the tenants, the ceilings being limewashed, and the floor and woodwork washed with soap and water, or solution of chlorinated lime, including disinfections after death	1,579
Total . .	2,306

The oral instructions given by the Medical Assistants, along with printed instructions drawn up by the Medical Officer of Health, do undoubtedly help greatly in limiting infection.

It is, however, not only at home that precautions must be taken, and in the workshops, common lodging-houses, public-houses, and in tramcars, suitable notices in reference to spitting are suspended. Beyond the cleansing enforced by the workshops' inspectors no special measures of disinfection have as yet been adopted in workshops; but this is a subject which awaits attention.

The notices used for the above purposes are given in Appendix I.

A communication was sent to the owners of workshops along with the notices, by the desire of the chairman of the Sanitary Committee, Alderman Walton Smith, which no doubt induced them to have these notices put up.

2. *Facilities for taking Personal Precautions.*

In carrying out personal precautions a consumptive may use in the workshop and while travelling either a spit bottle or a paper handkerchief. The type of spit-bottle is of consequence. It should be cheap, easily cleaned, and not too conspicuous. The best I have seen is one used at the Consumption Hospital in Manchester, which was brought by Dr. Moritz from the Sanatorium at Reibold's Grün. It is here exhibited.

Great care has to be used in thoroughly cleaning the spit-bottle with soda and hot water, and a small brush is needed such as is used for cleaning infants' bottles.

Also care must be used in keeping the moustache and beard clean.

As an alternative to the use of the spit-bottle, handkerchiefs of Japanese paper may be used. These are, however, very easily torn, and, as generally used, would contaminate the clothes owing to their permeability. If, however, they could be made impervious, without spoiling their texture, not only could the sputum be prevented from soiling the clothes, but they might be used for wiping the mouth and then folded so as not to soil the pocket.

Such an impermeable handkerchief has been devised by Mr. Lock, Clerk to the Health Office in connection with tuberculosis. I now exhibit some, and it will be seen that they are not only impervious, but that they are much less easily torn than they were before they were treated.

3. *The Maintenance of Supervision.*

During the first six months after the introduction of notification the visitors of the Ladies' Health Society paid fortnightly visits to a large proportion of the cases notified. It has been found impossible to sustain this burden with accumulating cases. In a large number of the cases visits are still paid by the Health Visitors once a month, while as regards the Sanitary Inspectors the period is also generally a month. But little dissatisfaction has

been expressed with these visits on the part of the Health Visitors, while a number of the Sanitary Inspectors declare that the people resent them. It is probable that this work would be more satisfactorily carried out by a special staff of women.

It is to be feared that some failure in supervision is, at present, inevitable, and that it will fall chiefly on the disinfecting operations.

Allowing, however, for some failure under this heading, an immense amount of disinfection and cleansing has been effected, while personal instruction is given and sufficient control is exercised to enable us to keep the consumptive cases under view.

4. *Hospital Provision.*

Hospital provision in reference to this disease may take two forms, viz., (1) sanatoria intended to receive cases in the earlier stage, and either to cure or to check the course of the disease, and (2) hospitals for the isolation of advanced cases.

To the first category belongs the Hospital for Consumption at Bowdon, near Manchester, containing fifty beds, and receiving patients from Manchester and Salford and district. This hospital is maintained by voluntary subscription. Owing to the pressure for admission cases have not been kept for periods longer than three months, and, as a consequence, cure has not been complete in the great majority of cases.

On the other hand, every person leaving the hospital is well drilled in preventive measures, and it may be doubted whether more good from the point of view of prevention has not been done in this way than if half the number had been kept over double the period.

Mr. W. J. Crossley, of this city, is providing the funds for the erection of an additional sanatorium for over seventy patients, a magnificent gift to the district. It is, I understand, in contemplation not only to continue the outdoor treatment now in progress, but to keep the patients in hospital over a longer period.

In the second direction, also, Mr. Crossley has anticipated the call of preventive medicine by the provision of a small home for cases of advanced phthisis in a populous district, but nearly three miles from the centre of the city. The persons admitted into this home are in the last stage of consumption, and it was clearly understood from the beginning that they were removed from their homes to die here.

One of the serious difficulties of an isolation hospital of this nature is that many of them do not die, but forthwith proceed to improve. The temporary hospital at Clayton has lately been used by the Corporation for the reception of a few cases of advanced phthisis from crowded homes, and the improvement in the individual cases has been marked.

The extent to which such hospital provision is needed may be gathered from the following figures:—

The number notified to the Public Health Office from institutions other

than the Union hospitals from September, 1899, to March 30th, 1901, was 835. These, with few exceptions, are out-patients, and it is probable that not more than 200 of them would be treated inside any hospital during their illness.

Further, out of 1291 cases notified, other than Union cases, 508 live in homes with more than one person to a room.

It can scarcely be doubted that the provision of hospitals for consumptives rests with sanitary authorities, though I am also of opinion that the taint of pauperism should be altogether removed from persons actually suffering from disease.

It may be pointed out that notification of phthisis is a necessary concomitant or antecedent to the municipal provision of hospitals for consumptives, so that the cases requiring to be removed to hospital may be selected on rational grounds, that is to say, with relation to the harm which they would effect by staying at home.

5. *The Evidence obtained of Direct Infection.*

This evidence is largely experimental. Cornet's researches showed that the houses inhabited by consumptives became storehouses of infection, if the consumptive were careless of his sputum and the house were not diligently cleaned. He also showed that the streets were not a source of danger, and that infection persists only in confined spaces in sufficient amount to be dangerous.

Dr. Harold Coates, Senior Assistant to the Medical Officer of Health, has presented an investigation conducted under the direction of Professor Delépine, which entirely confirms Cornet's results as regards houses.

The conclusions as regards houses are entirely applicable to many workshops, to public-houses, clubs, and other confined rooms, in which consumptive persons spit freely.

The continued observations made by Dr. Biggs, of the New York Board of Health, show that adjoining houses tend to become affected with tuberculosis, and so marked is this effect as to suggest that one house receives infection from another. Probably, in fact, so much infective dust accumulates in an infected house that, when swept out, it is able to infect persons living in the next house.

The time which has elapsed since voluntary notification came into force has not permitted of much evidence being collected of the same nature as that obtained in New York.

The clinical evidence obtained by the investigation of the cases in Manchester is based on these considerations. Supposing a person can be clearly shown to have begun to be ill in January, 1900, it is most probable that his infection was received somewhere about January, 1899, though the latent period may vary from two years down to a few months. If, then, during the possible period of infection, he can be shown to have been intimately associated with a consumptive person, there is good reason for

suspecting the latter to have been the source of his infection. On this and similar grounds there is evidence for supposing that the source of infection has been traced in 737 out of 1749 cases, notified from September 19, 1899, to December 31, 1900. The proportion may appear small, but many of the cases were absolutely untraceable; this was the fact in 508 instances. Of these the great majority came from common or other lodging-houses. The sources of infection are both interesting and suggestive. It may be remarked of them generally that it appears clear that infection has occurred by the intermediation of the dust of an infecting place, contaminated primarily from tuberculous sputa.

The probable period when infection was contracted by adults is controlled by the conclusion arrived at by independent observers that the most common interval between infection and death is from two to three years.

6. *The evidence as to the infectivity* of houses on their inhabitants has been already alluded to. On the manner in which persons inhabiting adjoining houses become infected, there is as yet no direct experimental evidence. But the investigation of this subject was on the point of being made under the direction of Professor Delépine by Dr. McCleary when he left Manchester, and will be taken up as soon as possible.

7. *Occupation and Personal Habit.*

When it is remembered that numbers of workpeople work together in badly ventilated and dirty workshops, and that the dust in many occupations is directly injurious to the lungs, while it is not easy for persons affected with a cough always to refrain from spitting in the workshop, it can hardly be doubted that the workshop itself is frequently infective.

The time during which notification has been in operation is too brief to adduce much direct evidence of the influence of particular workshops, although already some are coming clearly into view as centres of infection.

Care will have to be exercised in dealing with this subject in the interests of administration.

As regards the influence of physique and personal habit, the information collected does not admit of brief statement. To take the habit of drinking, for example, it has been abundantly proved that persons who drink to excess are exceptionally liable to phthisis. It is evident that a man who frequents public-houses in which persons spit freely—a number of them no doubt tuberculous—is specially exposed. The mortality from this cause amongst the servants of innkeepers is extremely high, and doubtless this arises largely from the infection of the public rooms.

Moreover the catarrh of drinkers exposes them in a high degree to infection. On every ground the frequenters of public-houses run a serious risk, and one which occasionally has been demonstrated by our inquiries.

The information actually obtained with regard to occupation is shown in Appendix I.

8. Amongst important matters relating to administration is the question of diagnosis. We have not seen our way to exclude from notification cases in which the sputum has not been proved to contain tubercle bacilli. The Assistant Medical Officers are generally able to tell when the character of the case is doubtful, and in all doubtful cases an effort is made to obtain samples of sputum for examination at the College. These are collected in tins which have been sterilised under Professor Delépine's direction. From September, 1899, to the end of March, 1901, 365 samples of sputum have been submitted, of which 140 contained tubercle bacilli, while none were demonstrated in the remaining 225.

Summing up, it will be seen that voluntary notification, imperfect as it is, allows much useful work to be done in instructing consumptives and their relatives in educated cleanliness, in removing sources of infection, in tracing the modes by which phthisis is propagated, in maintaining a sustained control over infected households, and in defining the spheres of usefulness of sanatoria and isolation hospitals.

In conclusion, I would express my deep regret that the chairman of the Sanitary Committee, Alderman Walton Smith, who has taken a deep interest in this question, is not able to take part in these proceedings.

LIST OF FORMS.

1. *Letter and Circular* sent to medical men *re* the scheme.
2. *Book of Certificates.*
3. *Medical Certificates* received; particulars contained therein are entered upon the Investigation Form.
4. *Investigation Form.*—Medical visitor enters upon this all information gained as to history of case, condition of house, disinfection required, etc. (*vide* 24).
5. *Report Form.*—Sanitary inspector reports condition of house in cases not visited by medical officer, or in special cases.
6. *Letter.*—Sent to tenant, if not found at home, to make appointment.
7. *Letters* sent to owner of property for permission to cleanse. Letters vary —if case at home—if in hospital—if house empty—if patient dead—if house dirty—if house clean.
8. *Cleansing Form*, upon which particulars of rooms, etc., to be disinfected are detailed for transmission to the disinfecting department.
9. *Report Form*, on which particulars of disinfection carried out, whether by Corporation or tenant, are to be reported in detail.
10. *Letter* sent to health visitor (central districts) instructing her to visit and have house cleaned periodically.

11. *Letters* sent to health visitor, with 8 and 9, to superintend the disinfection and report; vary, as to be visited subsequently, or not.

12. *Letter* notifying health visitor of a moribund patient, to report when death occurs. (Rarely required.)

13. *Circular to Publicans.*—Advises as to precautions.

14. *Circular to Proprietors of Workshops.*—Advises as to precautions.

15. *Notices, re* danger of spitting:

    (1) General (for walls);
    (2) For walls of workshops;
    (3) For walls of public-houses.

16. *Handbill.*—Precautions against the communication of consumption.

17. *Instructions to Persons suffering from Consumption.*—(Circular).

18. *Post-card* for patient, on change of residence, to report new address.

19. *Instruction to Inspectors* to visit and see that precautions are being carried out.

20. *Response to* 19.—"I have visited and found," etc.

21. *Large Register*, for 5,000 cases, in which are filled into columns the particulars entered on Investigation Form (*vide* 4) by medical visitors. Contains two extensive indices, one for names, the other for addresses.

22. *Ledger*, in which are posted all fees due to medical men for notification, and for taking specimens of sputum.

23. *Index* of names and addresses of employers and workshops implicated. (In course of preparation.)

24. *Files.*—Investigation Forms (4) are filed, one hundred making a volume, and numbered consecutively, but commencing afresh each year. Each number is entered with names and addresses, both in body of Register and in Index. The history of each case as regards disinfection, etc., is recorded on the form.

25. *Separate Files*, each with index, for 5, 8 and 9, also for medical certificates, bacteriological reports *re* sputum, and all letters relating to cases of phthisis.

N.B.—These forms, etc., as also Appendices II. and III., referred to in this Paper, will be found at the end of the discussion on Notification (see page 44).

"On the Notification of Tuberculous Diseases in Norway." By Dr. M. Holmboë, *Director of the Medical Service of Norway.*

According to the law of May 8th, 1900, on special measures to be taken against tuberculosis, which law came into force January 1st of this year, the compulsory notification of certain forms of this disease has been introduced into Norway.

As this law only refers to such forms of the disease as might transmit the contagion to healthy individuals, the duty of notifying is limited to such cases of tuberculous origin as are attended with secretions presumably conducive to the spreading of the disease. It has therefore been resolved that the law, until further notice be given, shall be applicable only to the following forms:—

(*a*) Pulmonary diseases that are attended with expectoration, the tuberculous nature of which has been ascertained by the physician either by demonstrating tubercle bacilli in the sputum, or by the physical symptoms and course of the disease; also tuberculous laryngitis if attended with expectoration.

(*b*) Inflammatory processes with formation of fistulas in the bony system, in joints, lymph glands, etc., which the attending physician considers as being of tuberculous nature.

(*c*) Tuberculosis of the skin (lupus) if attended with ulcerous discharge.

(*d*) Tuberculous affections of the alimentary tract, and of the urinary system, if their nature has been ascertained by the demonstration of tubercle bacilli in the evacuations.

Every physician who has such a case for treatment is compelled to report it to the Health Officer of the district. This officer, who, according to the Sanitary Code of Norway, is always a physician, has to register these cases as well as those under his own treatment. It is his duty to keep the contents of this register and the reports sent in with as much secrecy as is required of all physicians as regards confidential communications made them by their patients. If the Health Officer, for want of time or other cogent reason, should be prevented from keeping the register himself, it shall be the duty of that person to whom this task is entrusted to preserve absolute silence concerning everything that might hereby come to his knowledge.

On the death of a patient to whose disease this law applies those persons who, according to the civil code, are bound to give notice of such death, viz., the nearest connections of the deceased, shall make the same known to the attending physician, who, in his turn, has to report it to the Health Officer.

By resolution of the Board of Health and the Municipal Council, afterwards approved of by the Government, decision may also be taken that notification shall be made each time a consumptive person changes his or her abode. A great many especially rural districts have already passed such a resolution; and Royal sanction will in all probability be given in the nearest future.

Compulsory notification was mainly introduced in order to give the Health Officer an opportunity to exercise sufficient control with regard to the cleanliness to be observed in the houses of the sick, especially as to the disposal of their secretions, and in case of death or removal to see that a radical cleansing be made of the premises occupied by the deceased, and also of wearing apparel, bedclothes, etc., before others make use of them.

The attending physician is obliged to see that cleanliness is maintained in the home of the patient. Should he not be able to enforce this, it is his duty to report the matter to the Health Officer, who then has to undertake the sanitary supervision, which he also has to do in such cases, where the sick person is not under the care of a physician. Should the Health Officer find that either the habits of the patient or the state of his dwelling give special reason to apprehend the transmission of the disease to others, the case shall be brought before the Board of Health in order that this body may decide on the steps to be taken. If the patient or his connections fail to act in concurrence with the orders given by the Board of Health, and it consequently proves impossible to procure the patient nursing conducive to counteract the spreading of the disease, the Board of Health are empowered to give orders for his or her removal to a hospital; however, husband and wife may not be separated, if they should express the wish to remain together.

If tuberculous diseases should be of frequent occurrence in a house, school or workshop, a special report is to be sent to the Director of Medical Affairs Special measures will then, if necessary, be taken after consultation with the said Director.

The law was under discussion for several years, and during this discussion the duty of notification gave rise to great diversity of opinion. From several sides, from physicians as well as from the public, objections were raised. It was asserted that such directions would come into conflict with the claims of humanity in stamping such sick persons as a danger to those that come in contact with them, and in exposing them to a painful and mortifying control.

Meanwhile, Government, as well as the majority of the Storthing, came to the conclusion that compulsory notification is absolutely necessary to carry into effect the measures taken by the State to counteract infectious diseases. Besides this, it was thought that the notifications, when given a discretionary character, might be freed from any odious stamp, and that the same would be the case with the supervision of patients when the attending physician, as far as possible, was entrusted with the inspection.

The law has been too short a time in force to allow of anything being stated with certainty of its effects. In regard to unpleasantness to the sick, which was feared would be the result of compulsory notification, it is worthy of note that hitherto no complaint against such an inconvenience has been brought to the notice of the Medical Government Board. Hence there is every reason to believe that the municipal sanitary authorities have understood how to use the power with which the law has invested them, with desirable tact and discretion.

Dr. KNOPF (New York): As a New Yorker and as a pupil of Professor Biggs, as well as Professor Janeway, I confess freely that I approve in substance of everything that has been said in the paper, but since I am on the platform I may be allowed to express a few opinions which I hold in regard to compulsory notification and voluntary notification. I would approve most heartily of compulsory notification, of intervention and power of the sanitary authorities, under two conditions: that the sanitary inspector, on being notified that at such and such a number in such and such a street there is a consumptive without means, should have the power and the means to immediately place the patient in a sanatorium, where the patient would have a chance to be cured or isolated, and by being transferred to a sanatorium could no longer be a focus of infection for his family, kin, and neighbours; secondly, there must be enough means in a municipality that if the patient is removed and his family no longer able to live without the support of the bread-winner of the family, the municipality should provide for the maintenance of that family until that patient is cured; otherwise compulsory notification is impossible. With regard to voluntary notification, I have had some experience in New York, and I know its great value. At the same time, if through voluntary notification the already great burden on the consumptive's finances should be increased I would protest even against voluntary notification. On the other hand, if voluntary notification is carried out as it is in New York, where it is left to the discretion of the physician, very valuable knowledge will be gained through this procedure, and statistical science will greatly gain thereby. We will detect localities where consumption is most frequent, and many of the not yet understood causes of the prevalence of tuberculosis in certain districts may be revealed. I will close by telling you a little incident illustrating the benefit we in New York derive from compulsory notification. I had the honour to address some fourteen months ago an audience which was called the Tenement House Conference. We had exhibited in New York the various conditions of our tenement districts, we had models of our fearfully filthy habitations of the poor, and by the side of them we had model tenement houses, constructed after the excellent model houses of England. In my little paper, which was entitled "Tenements and Tuberculosis," I used the language referred to in Mr. Biggs' paper, showing what a terrible condition existed in regard to tuberculosis in our tenements. I maintained that if I should be asked what was the most important factor in New York in the propagation of tuberculosis, I would answer, the fearfully filthy conditions which existed in the tenement houses, and which were allowed to exist in spite of laws which were not enacted. On the motion of a gentleman my little paper was printed, and was very largely distributed among the Legislature, who were very sceptical regarding tenement tuberculosis, and as a result we received our first 50,000 dollars for the erection of a sanatorium for the consumptive poor of New York. (Cheers.)

Councillor HERBERT ALDERSON, M.D. (Kensington Town Council): I entirely agree—and my experience in the matter of the prevention of

tuberculosis, as far as it relates to Kensington, coincides with that of others—that a single circulation of educational pamphlets dealing with the measures to be taken to prevent the spread of tuberculosis, and voluntary notification *without* the payment of a fee to the medical man, has not produced the results hoped and expected.

I brought the matter before the Kensington Vestry in 1899, soon after the Marlborough House meeting, and the members were good enough to accept my facts, and determined to take action in the matter. A leaflet, similar to leaflet No. 1 of the National Association for the Prevention of Tuberculosis, was drawn up and circulated among medical practitioners, nurses, clergymen, district visitors, heads of schools, philanthropic societies, and some others, together with a letter intimating that more leaflets could be obtained free of charge by application at the town hall. The final paragraphs of our leaflet ran as follows :—"After the death of a consumptive person, or after the removal of a consumptive person from one house to another, the room occupied by such person should not be occupied again until it and its contents shall have been cleansed and disinfected. If the assistance of the vestry is desired for disinfection of rooms, carpets, rugs, bedding, clothing, etc., make application to the Medical Officer of Health at the town hall.

"In all cases in which there may be proved inability to pay, disinfection will be done free of cost.

"Persons in charge of consumptive patients should apply to their regular medical attendant, or to the Medical Officer of Health at the town hall, for advice as to the disinfection, which should be carried out from time to time during the illness of the patient."

I will at once say, gentlemen, that I am of the opinion that disinfection should be offered free of charge to all ratepayers, independent of any position a particular ratepayer may happen to occupy.

I also hold that the best way to bring about voluntary notification is to educate the public by distributing leaflet No. 1 of the National Association at regular intervals, and by all other means that may be possible.

There is no manner of doubt but that this Congress will have an immense educational effect on the general public.

As to the point of paying a half-crown fee to medical men for voluntarily notifying tuberculosis (and I myself am not in favour of compulsory notifying the disease), there cannot be any doubt that such a proceeding is a great deal more likely to have a better result than if the fee is smaller or omitted altogether.

It must be remembered that by far the majority of cases of tuberculosis occur among the poor, in the practice of general practitioners, who do a great deal of work for a very little money, who already have to write a great many certificates gratuitously, death certificates, school board and club certificates, etc.

I think we should rely for efficient voluntary notification on educating the public, on the active help of clergymen, district visitors, nurses, as well as the medical profession; borough councils should pass a resolution requesting

guardians to instruct their clerk to notify to the Medical Officer of Health the name and address of everyone entering the infirmary with tuberculosis, also when a patient leaves the infirmary. As is of course well known, a phthisical patient often goes into the infirmary for an acute feverish attack, and as soon as he is better, with that wonderful hopefulness of consumptive invalids, is anxious to return home, and perhaps to work. Also the poor law medical officers who visit outside and at the dispensary should be instructed to notify their cases to the clerk of the guardians, that he might send on to the Medical Officer of Health, or, better, notify themselves direct to the Medical Officer of Health.

A scheme might also be arranged, I think, without much difficulty, by which the staff of hospitals and dispensaries, either directly or through the secretary of the institution, might notify their cases of tuberculosis to the Medical Officer of Health.

Also the Medical Officer of Health, being furnished once a week with a copy of all death certificates, should make energetic use of, and take action on, the information so obtained.

In those ways many voluntary certificates would be obtained, much valuable information procured, and beneficial action taken.

But of course local authorities must remember that all this entails a large amount of work from the Medical Officer of Health and those in his department, and they must be prepared to supply such assistance as may be necessary and vote the necessary supplies.

In conclusion I should like to say that I am, and, I think, many others also are, very thankful for the dogmatic statements which can be found in the July number of *Tuberculosis*, under the head "Disinfection after Phthisis." Many of us, I think, must have felt from time to time very doubtful of the efficacy of some of the means used for the purpose of disinfection after phthisis. Now we have a statement on this point, with all the weight of the National Association at its back, which completes a series of dogmatic statements which we may make when urging local authorities to take measures to prevent the spread of tuberculosis.

Dr. Robertson (Medical Officer of Health, Sheffield): Mr. Chairman, Ladies and Gentlemen,—I propose to confine my remarks to the results of our work at Sheffield in the voluntary notification of phthisis. We have had it in operation there for nearly two years now, and there are one or two points on which we have found out where we have made mistakes, and where we are able to take advantage of our mistakes, and it may be of advantage to others if I tell you the results. With a population of nearly 400,000 people, we have obtained on an average nearly 600 notifications per year. When the case is notified—and each notification is paid for at the ordinary notification rate of 2*s.* 6*d.* for private cases and 1*s.* for institution cases—an inspector is sent to the house to get certain information, which he fills up in the report which I see afterwards, and then he leaves certain printed instructions, perhaps a little more in detail than those printed in the pamphlets of the National

Society. What I have been struck with more than anything else is the fact that in the great majority of cases, where these instructions have been given, they have been attended to fairly well. There are a few cases where the instructions have not been paid any attention to, but these cases are very few indeed. I do think that the distribution to the persons suffering, to the infectious persons, of proper information is of great gain, and will be of immense value in the near future. Of course it is a new work, and one cannot expect to see any good from it at once, but one hopes that in a few years' time, by limiting the amount of infection from these cases, one will get considerable good. The educational value of the inspector's visits, I think, is very great, and as I have already said, one obtains good results in the houses. One sees people using spittoons, taking care of the expectoration, sleeping in separate bedrooms, or having separate beds where children or sisters or servants sleep together, and doing all sorts of things to prevent the spread of infection. We made a great mistake in one condition of notification. We asked that when the medical practitioner notified the case he should at the same time send a specimen of the sputum or other infectious material to the laboratory for examination, and that the case should not be considered a case unless the tubercle bacilli were found. I am sure that was wrong, and quite unnecessary, and I hope we may be able to undo that in the near future. That limited to a very considerable extent the number of cases which were notified. In a manufacturing town like Sheffield, where one has a large number of busy practitioners engaged in treating the poor, it is absolutely essential that such work should be done; they have not time to instruct their patients in the methods of prevention. I think there is no question that, in practice at any rate, one finds they do not have the time to go into the details of prevention which are necessary, and that can only be done by a proper inspector. Then as to the class of inspector to be employed for this work: I think perhaps we made a mistake there also. We have a man who devotes the whole of his attention to the work, but he is not a medical man. I think if one had to reappoint, one would endeavour, if possible, to get a qualified medical man to carry out the work. I believe very much indeed in skilled advice: very much more notice is taken of it, and I am sure he would see things that the unqualified man cannot see. It has always been feared that the visits of the inspector would be resented very much. We have had, as I have said, perhaps 1,100 or 1,200 cases notified, and in only one case has there been any objection that I have heard raised to the inspector's visit, and that was a case where, by a pure accident, the patient happened to be present in the room, and where objection was taken to the fact that the inspector made certain remarks which hurt the feelings of the patient. But in no other case have I heard—and I have made pretty careful inquiries—of any difficulty whatever. We have found considerable difficulty in regard to taking steps to deal with the workshops where these people have been working. In several of our trades in Sheffield the workshops have earthen floors. Some of the forging shops, and file-cutting shops, and so on, cannot be cleaned, and where we have endeavoured to get the manufacturer to

cleanse the floor he has always wanted to know why it is that we have singled him out especially to do it, and in a good many cases we have had to leave it alone and do nothing, rather than give the information that the reason was that one of his workmen was tuberculous, and that the floor therefore required to be cleansed.

Dr. COOPER PATTIN (Medical Officer of Health, Norwich): Mr. President, Ladies and Gentlemen,—I am not going to detain you long, because it will only weary you and fatigue me to go over the advantages that you can gain from the voluntary notification of phthisis. I will confine myself simply to stating that while I have found voluntary notification in Norwich work fairly well and certainly cause no administrative difficulty whatsoever, I am strongly of opinion that it is not sufficient to effect the purposes that we have in view. My reason for speaking to-day is because I rather wish to suggest to my *confrères* that they should adopt the same method. Of course I get, as we all get, returns every week of the deaths from tuberculosis. For the last eight years in Norwich I have carried out voluntary disinfection of the rooms in which any person has died from phthisis. The first year in which I introduced that plan I got five per cent. of the rooms disinfected, and last year ninety-five per cent. In asking for the voluntary notification of phthisis, I have myself been most anxious to get information about the homes, especially to take steps to disinfect the homes after death or the removal of a patient. I can get the deaths from the death returns, but I do not want to wait for them, because in large country towns there is a considerable amount of removal going on from time to time. In the city that I represent I have some evidence that houses which have been affected by tuberculosis have handed this disease on to certainly a second and sometimes a third family inhabiting them. To get that information, I now have inspectors whose duty it is to make a polite inquiry if there is any sickness in the house, and of what character. In this way I learn of a certain number of cases of consumption. I do not know whether you have lady inspectors, but we are just appointing one in Norwich. I am expecting to get most valuable information through her, because she will not confine her attention, as the male inspectors usually do, to the lower floors of the dwelling, but it will be part of her business to go into the bedrooms—that is, with the assent of the people—and I shall instruct that lady to notify to me any case of consumption that may be in the habitation, and in this way I look forward to getting a great deal of valuable information through her. In the notification of the pulmonary type of tuberculosis, I think we are doing what the medical profession did some years ago when it attributed typhoid practically to water, and intestinal tuberculosis in children to milk. I think we must bear in mind that there is a large group of forms of disease that are not distinctly pulmonary, and we have to bear in mind that the public do not lose sight of them. For instance, at the International Congress at Buda-Pesth in 1894, I read a paper there in which I strongly advocated the compulsory notification of all forms of tuberculosis. I retain that position, which I have had fortified by my observations and

experiences ever since. The reasons that led me to take that point of view were these. In my practice, before I took up public health work, I attended over a thousand people with tubercular disease, and I was very much struck with the very large proportion of them in which the pulmonary tuberculosis was obviously secondary. I would like to put this question to the general practitioners and physicians: In how many cases of pulmonary tuberculosis is the pulmonary affection a primary lesion? My impression is that you will find it come out a much smaller proportion than you thought for. In the city of Norwich I am struck by this, that of the deaths from tuberculous diseases practically three hundred are from forms of it that are not pulmonary. There is some tendency of losing sight of the very large group of tuberculous diseases which will be productive of mischief and propagate the disease, if you confine your attention entirely to pulmonary tuberculosis. I am perfectly sure of the fact that it is pretty well useless to advocate compulsory notification unless you are prepared to provide hospitals for the segregation of cases. It is quite true that you are dealing with a disease, the infectivity of which is of low intensity, but it is of long duration. I am going on the principle that half a loaf is better than no bread. I am in favour of the notification of the phthisical form of tuberculosis if we can obtain it, but I do not want us to lose sight of the fact that there is a very large amount of tuberculous disease and of the phthisical form of tuberculous disease that is due to tuberculosis in another organ and commencing in another way, and there is some little risk of our doing that from the amount of attention we are giving to the subject. We want more help from the Local Government Board. I believe my Committee at Norwich would schedule the tuberculous diseases as infectious and have them put under the ordinary Infectious Diseases Acts, but so far as I am informed the Local Government Board would not encourage and would not directly sanction it, so we shall have to wait until we get legislative changes. Our President told us that we must educate the public before we can hope for that. Listening to-day, as I did, to the reading of Dr. Biggs' paper, I was interested to find confirmed what I always believed theoretically, that any educated democracy of an Anglo-Saxon origin will not make a fuss about interfering with the liberty of the subject where the public health is obviously concerned. My great hope is that this meeting here in London will have the effect of disseminating information, at any rate amongst the laity, and bring some of that pressure of public opinion to bear upon our Legislature, which is the only effective method for us to adopt in a campaign against tuberculosis.

Dr. A. K. Stone (Boston, U.S.A.): Mr. President, Ladies and Gentlemen,—I represent here to-day the Boston Board of Health, and I have come here to tell you what they have done in regard to this matter. Our work began a little later than that in New York. We wanted to go a little bit slow, and find out what good results were going to be obtained from compulsory notification. We began our campaign in a general way with the physicians of the State and of the city. Last year the Board of Health sent out a change in their regulations, and said that after May 15th "pulmonary and laryngeal

tuberculosis are now included in the list of diseases of which compulsory notification is required. After removal or death of the patient the Board of Health will disinfect the premises." The physicians took very kindly to the work and made quick returns; in fact, we had about fifteen hundred returns last year. The number of disinfections called for was some six hundred or eight hundred. The next trouble that we had was, that if we were going to have compulsory notification, we had to have the ability to handle the patients that are a menace to the health of the community. In Boston we had only the Long Island Hospital, a pauper institution, and the State pauper institution, both of which had most excellent tuberculosis wings, devoted entirely to the treatment of tuberculosis. But to get non-pauper patients to go there was a difficulty. In spite of that, our Board went ahead, and made in the last year no less than fourteen forcible removals, taking the patients to either one or other of those institutions. We treated the conditions in exactly the same way as we treat the conditions for diphtheria or scarlet fever. Then we went to work and tried to get a municipal hospital, believing that in that way we should have the same results that we had with the diphtheria and scarlet fever patients. At first there was great trouble in getting persons to go to our hospital for contagious diseases, but in a short time, after a year or two, persons would come with their children in their arms, at the very beginning of the disease, and ask to be admitted; and we hope the same conditions will obtain when we have our municipal hospital. We arranged for Dr. Clarke to come from New York and tell us the value of the sanatorium treatment, and the result was that he so enthused some of our City Fathers who were there that they voted us a goodly sum of money with which to make a start, and we are quite sure that we shall soon have the first municipal hospital in the United States for the treatment of consumptives, which will be under the authority of the Board of Health. (Cheers.)

(See also Dr. Stone's paper at end of discussion, page 40.)

Mr. HOFFMANN (United States): Mr. Chairman and Gentlemen,—A point has occurred to me during this discussion which seems to me of sufficient importance to warrant my taking up a few minutes of your time. In the discussion of notification schemes, practically nothing has been said of reaching that large group of cases where men or women are in the very incipient stage of the disease, or where perhaps the disease has not at all developed, but where the individual merely represents a phthisical type. Now there are various agencies and bodies by which these types or individuals are reached, and where an exceptional opportunity is presented for missionary work or educational work, which, as one of my predecessors has pointed out, is never amiss in a free democracy among an intelligent people. I refer to the large number of medical examinations which are made in the Army, Navy, Police, and Fire forces, and I believe also in this country in the Post Office Department; in our country, in the Young Men's Christian Association, in the physical department, in the colleges, and most of all by the life insurance companies. From 5 to 25 per cent. of the applicants for entrance into

insurance companies are rejected, and of that number a very large proportion are rejected either for family history or for actual evidence of phthisis. In addition a very large proportion are rejected for light weight and for imperfect chest expansion or vital capacity, indicating a phthisical type. Now it has occurred to me that this very large body of people at a stage when we to-day believe that consumption can be prevented as well as cured, should be by some means reached. It is not for me to discuss this point now, but merely to throw out the suggestion as to how that class of people could be dealt with at a stage when the very best results are to be obtained, and when the life of the individual himself will be saved for many years, instead of concerning ourselves almost exclusively with the notification question. While, therefore, I am in full sympathy and harmony with everything that will tend to bring together a large body of facts in regard to the actual cases of phthisis, deaths from phthisis, and their location, and so on, I think our energies should be directed to some way which would lead us to reach the still larger body of cases where advice or help or assistance would be productive of so immeasurable an amount of good.

Professor RUATA (Perugia): I must apologise to you because my manner of expressing myself is not good: my English is bad; but I will try as far as possible to express myself clearly. I wish to make a few remarks about the most interesting questions of compulsory notification and non-compulsory notification. I heard a comparison between tuberculosis, small-pox, whooping-cough and such kinds of diseases. The questions connected with tuberculosis are quite different. Small-pox begins suddenly and is infectious for a short time only. In the case of small-pox you can compulsorily take the patient and isolate him from the rest of his family, and the results are always certain. On that question I think we are all agreed, that the medical profession is authorised to require from the legislative authorities a law for compelling compulsory notification of these kinds of disease. But if we take a person with phthisis the circumstances are quite different when we do not know the manner of beginning—at least, I do not know. I will give you one or two instances. In a family I see a case of pleurisy; it goes on well and is cured, but ten or fifteen years afterwards you see a case of consumption or phthisis. I am almost certain from my experience that there is a direct relation between the first attack and the consumption that comes afterwards. Take another practical case. There is in a family a consumptive person who dies, and after the death of that person, three, four, five, or ten years afterwards—sixteen years afterwards in one case—a case of consumption occurs in a member of that family. I am quite certain for my own part that the disease began when the first case occurred in that family. It began with a very small point of tuberculosis and then multiplied very slowly—quicker if the sanitary conditions of the house were bad, and slower if the hygienic conditions were good. Those are difficulties which are constantly occurring, but I am sure that the tuberculosis came from the first case. What would you do with these cases? Sometimes you know of a patient who has been tuberculous for

fifteen years, and what would you do with a compulsory notification in that case? I entirely agree with compulsory notification when we can say to the legislature, "You must do so and so," but if compulsory notification is adopted only for curiosity I do not agree with it. It is necessary that after compulsory notification the authorities should act. There are so many difficulties connected with that matter that I will not trouble you with them, because they are so well known. I only remember one great English medical man who treated the question practically in England, Sir Richard Thorne-Thorne. In a monograph which he published about three or four years ago he treated the question so well and so practically that I entirely agree with what he said. It seems to me that the question is extremely complicated, and that we must have more confidence in the power of the medical man. On this head I must say that I was rather struck by the assertion made by a *confrère* of mine just now, that in his town medical practitioners are so busy that they have not time to give instructions. I cannot understand it. It seems to me that the mission of our profession is so very high, so tremendous, that I cannot understand how a medical man can see a patient with tuberculosis, for the treatment of which he cannot do much, but he can do something in the way of preventing its diffusion among poor people, and not have time to do this good, but have time to do the first doubtful good. I cannot understand that. I will only say one word about what we have done in Italy. I am not in favour of compulsory notification, but we have done something lately which it seems to me is most practical and of which I approve. Lately a law has been passed by Parliament that notification of pulmonary consumption shall be compulsory in a few instances. The law now makes it compulsory to notify tuberculosis in all colleges and convents. Our law also makes it compulsory to notify every case of death from tuberculosis, because after a death the sanitary authority must send to disinfect the house where the death took place. It seems to me that these points are most practical. I thank you most cordially for the kind hearing that you have given to me.

Dr. Reynolds (Chicago, U.S.A.): Mr. Chairman, Ladies and Gentlemen,—I regret that I arrived too late to hear the Paper of Dr. Biggs, which was presented by my former teacher, Dr. Janeway. In Chicago we have not yet come to the conclusion that it was right that we should insist upon compulsory notification of tuberculosis. We do believe, however, that the municipality, through the Department of Health, should have a responsibility in educating the public and the profession when it it is necessary in this particular. We believe that the education of the public is the one thing needed, and the thing that all must seek to bring about. We have in Chicago, not under the Department of Health, but under the County Government, a hospital for the tuberculous poor which has been running for many years. My friend from Boston perhaps has not heard about it. The education of the public must be brought about primarily through the medical profession in their daily visits. (Hear, hear.) I believe the medical profession are a trifle lax in this particular in our city. The next agency that we use in Chicago is the

public Press. That is the best agency I know of, next to the physician, for conveying the intelligence to the public that they ought to have. Medical men in our city in the past few years have been delivering lectures in the schoolhouses in the evening on these subjects. Medical men have occasionally, and I think with profit, occupied some of the pulpits of our more liberal churches on the Sabbath day. (Hear, hear.) I thank the people who have organised this Congress very much indeed on behalf of Chicago—for I have the honour to represent the Mayor—because I believe that the education which will ramify from this Congress will reach every corner of the earth, and reach many of those who are suffering from tuberculosis. We do not feel that the tuberculosis patient, whether rich or poor, should have, through compulsory notification or anything else, a rod held up before him by which he will feel that he will be scourged. What he needs is help, aid and sympathy.

A DELEGATE: Is this Paper to be followed by a Resolution bearing on notification?

The CHAIRMAN: Yes.

Dr. NEWSHOLME (Brighton): Mr. Chairman, Ladies and Gentlemen,—My views on the subject of notification are so very well known that it is not necessary for me to detain the audience more than two or three minutes. One cannot be struck, in the remarks that have been made during this discussion, by the immense advance which the question of notification has made. Since I first read a Paper on this subject three or four years ago, which received very great opposition, one cannot help feeling that now the picture is altered altogether, and that the principle of some form of notification is pretty generally accepted. The only question is really what form of notification shall be adopted, whether it shall be compulsory or voluntary notification. Personally there is much, in my view, to be said in favour of compulsory notification. To begin with, it would enable us to get more complete information, and by that means ascertain the incidence of consumptive diseases in slums, and thus have an additional leverage for their destruction. In the next place it would enable us to ascertain, as we are not able to do now, the changes of address of patients. One of the great points with regard to voluntary notification in my experience in Brighton is, that a patient may have left the house for three or six months, the case having been voluntarily notified previously, and at the end of three months it is found that the patient has left the house and has gone elsewhere. In the meantime no disinfection of that house has been done before the next family, probably with a large number of children, enter it. In that way no doubt a certain amount of mischief results, and that mischief would be remedied by compulsory as against voluntary notification. I think, furthermore, an ethical difficulty would be removed. Many doctors object to notify cases of phthisis, unless it is a statutory duty imposed upon them; they feel that they have no right to divulge information with regard to their patients. That does not apply in practice with regard to hospitals and

poor law patients, and, as a matter of fact, in my district voluntary notification has worked with practically no friction whatever. I represent the town of Brighton, which was the first to have a system of voluntary notification of phthisis in operation in this country. For seven months before any town had it in operation we were having a very considerable number of cases notified, and we were taking the precautionary measures which naturally follow after such notification. The numbers thus notified are, I regret to say, much smaller than those in Manchester, where a magnificent system, which has been described by Alderman McDougall, is being carried on under the supervision of Dr. Niven. Before we began the notification of phthisis in Brighton, we had a complete system of disinfection since 1893 of all houses where death from consumption had occurred. Before we began notification again, we had a system of voluntary examination of sputa. Last year, for instance, we examined about 100 specimens of sputum, which were phthisical, or were suspected of being phthisical. These examinations of sputum were not followed by visits, although the address of the patient was given in every case, unless a formal notification was made, and by that means we have been enabled to help doctors in getting early information as to the character of their cases. But it seems to me that the main point for us to consider this morning is, How far can we go unanimously? It is very important that any Resolution which is to be passed by this meeting should be of such a character that it will be endorsed by the other sections of this important Congress. We have to remember that this Congress represents, not only administrators from various parts of the country, but also bacteriologists, pathologists, and physicians; and members of Town Councils, of course, will take an important part in it. We have to propose a Resolution, which will be endorsed by all these if possible, and for that reason we have drafted a Resolution in favour of voluntary notification, which it appears to me will be, if endorsed by this Congress, an important step in advance, and will, I am quite certain, very favourably advance the progress of the important measures which we wish to take for the prevention of phthisis. I will therefore conclude by moving the following Resolution:—

"That the voluntary notification of cases of phthisis attended with tuberculous expectoration, and the increased preventive action which it has rendered practicable, have been attended by a promising measure of success, and that the extension of such voluntary notification should be encouraged in all districts in which efficient sanitary administration renders it practical to adopt the consequential measures." That is the Resolution which I have the pleasure to propose.

Sir HENRY LITTLEJOHN (Medical Officer of Health of Edinburgh): Mr. President and Gentlemen,—In one word I have the greatest possible pleasure in seconding this Resolution. I come here from the metropolis of Scotland to await the decision of this most important section. They refuse to budge until such time as this section has given something like a deliverance upon this important subject—namely, voluntary or compulsory

notification. Personally, as an old Medical Officer of Health who was one of the pioneers of the compulsory notification of infectious diseases, I should prefer compulsory notification; but I am forced to confess that the public requires still more education on the subject, and I am therefore compelled to swallow, somewhat with difficulty, the notification which has been placed before us to-day. As I say, I come from Edinburgh, a city comprising a large amount of poor population. We find in Scotland that all our country population is gradually converging towards the town, and accordingly our poor population is increasing. As you know, Edinburgh is a city of tenement houses, and it is impossible for us to ever imagine that we will get rid of tenement houses in our crowded centres of population. Land is so valuable that it is utterly impossible to build single houses for families. No doubt that would be a great advantage, but there can be little doubt from my experience in Edinburgh that tenement houses can be rendered habitable, and under the careful supervision of the medical officer of health and his staff they can be rendered thoroughly sanitary and healthy. The law in Scotland is this, as you know, Mr. Chairman, that if a bread-winner is struck down by disease, the family, *ipso facto*, becomes the subject of parochial relief. The family is supported so long as the head of the family is affected, and if that head of the family is removed to a hospital to be treated for consumption the family are maintained creditably; they are relieved from the possible infection from the head of the family, and all goes on well. That relates to the very poorest of the population. But we have another class a little higher, who pay their rates, and who never come under the cognisance of the police or the civil authorities with bad intent. What is to be done with regard to these? We find that these must be attended to by being placed in a proper hospital, allowing the family to be delivered from the care of attending on the sick relative, and to allow the members of the family to follow their ordinary occupations. By a system of notification, whether voluntary or compulsory, we are enabled to arrive at a knowledge of the amount of hospital accommodation required for these two classes, and looking at the subject as an old Medical Officer of Health I have no hesitation in saying that now is the time that this most important Congress, in no uncertain voice, should decide with regard to the notification of this awful scourge.

Sir JOHN COCKBURN (Representative of South Australian Government): I should like to see the Resolution so drawn that, while it encouraged notification in every possible way, it did not discourage compulsory notification. I think that voluntary notification is all that is possible in many cases; it is a sort of schoolmaster, to educate people up to what we all look forward to ultimately, a system of compulsory notification. But what I should dread is that this Resolution being carried might be used as an argument against compulsory notification in some cases where there is a chance of attaining that degree of perfection. It might be used by councils and other civic bodies as the outcome of the deliberations of this Conference in this respect—that we had decided in favour of voluntary notification only, and impediments might be placed in the way of those pioneers who, wherever

possible, wished to see compulsory notification. In South Australia we have compulsory notification, and I should be sorry to see those who have worked so hard in that direction getting a set-back by people saying that this Conference has passed voluntary notification, and voluntary notification only. I would ask if it is possible so to amend the Resolution as to make it appear that the opinion of this Conference is in favour of notification, but not of voluntary notification only.

The CHAIRMAN: I think I can suggest a form of words which will meet Sir John Cockburn's objection. The Resolution says: "That the voluntary notification of cases of phthisis attended with tuberculous expectoration, and the increased preventive action which it has rendered practicable, have been attended by a promising measure of success." Upon that we are all agreed. Then the Resolution says: "And that the extension of such voluntary notification should be encouraged in all districts in which efficient sanitary administration renders it practicable to adopt the consequential measures." I would suggest the omission of the word "voluntary" in the second clause, so that it would read, "and that the extension of such notification," which would include compulsory, "should be encouraged in all districts," etc.

Dr. NEWSHOLME: I heartily agree with that.

The Resolution, with the omission of the word "voluntary" in the second clause, was then put, and carried with acclamation.

"The Notification of Tuberculosis in Boston, U.S.A." By A. K. Stone, *Boston, U.S.A.*

The Boston Board of Health felt its way slowly, and did not take the final step in regard to compulsory notification until it was possible to carry out the steps which logically must arise from such an action. Circulars were sent out from time to time, and finally, in May, 1900, circular No. 3 was issued. When, in accordance with the provisions of this circular, a physician gives notification of a case of tuberculosis, he is sent circular No. 4, which he gives to some member of the family with necessary verbal instructions.

Interference for isolation or removal is only resorted to in cases specially reported by charity organisations or inspectors, and when great helplessness or poverty is found, or there is a condition of affairs likely to spread the disease. In general it is the attempt of the Board of Health to educate the family and the patient so as to prevent the spread of the disease to those having to do with the patient. From May 17, 1900, to July 8, 1901, there were reported 1487 cases of tuberculosis. There were over 600 cases where the Board of Health have been called upon to disinfect the premises where a person having consumption had lived.

In 14 cases the Board of Health has seen fit to cause the forcible removal of the patient to a pauper hospital where the patient could be properly treated.

Money for a new municipal hospital for the treatment of advanced cases

of tuberculosis has just been appropriated, which, when in working order, will greatly facilitate the action of the Board in its attempt to diminish the death-rate from tuberculosis.

No. 1.

THE PREVENTION OF CONSUMPTION.

Consumption is the most destructive disease of New England, the number of persons dying annually from this cause in Massachusetts amounting to nearly 6000.

The disease is infectious, and can be communicated from one person to another. The chief danger exists in the expectoration of the sick, and if this expectoration is carefully destroyed little danger need be feared.

Consumptives should be instructed not to spit upon the floors of rooms, public halls, street and railway cars, and other vehicles, nor in the streets, but into pieces of cloth or receptacles made for the purpose containing water or a saturated solution of carbolic acid (one part of carbolic acid crystals to about fifteen parts of water). Such bits of cloth should be destroyed by fire before the sputum becomes dry, and other receptacles should be cleansed with scalding water, their contents having been destroyed or otherwise carefully disposed of. Handkerchiefs which may have been used from necessity should be boiled half an hour before washing.

A healthy person should not sleep in the same room with a consumptive.

Remember that sputa must never be allowed to become dry.

OFFICE OF THE STATE BOARD OF HEALTH OF MASS.
May, 1894.

HEALTH DEPARTMENT, *Boston*.

June, 1894.

The Boston Board of Health heartily endorses and adopts the above circular of advice from the State Board of Health, and earnestly recommends its consideration and use by the physicians and inhabitants of Boston.

THE BOARD OF HEALTH.
S. H. DURGIN, *Chairman*.

No. 2.

HEALTH DEPARTMENT, OLD COURT HOUSE.

BOSTON, *March* 23, 1899.

At a meeting of the Board of Health, this day, the regulation dated October 13, 1896, respecting the deposit of sputum in street cars, was amended so as to read as follows:

> "The Board of Health hereby adjudges that the deposit of sputum in public places is a nuisance, source of filth and cause of sickness, and hereby orders: That spitting upon the floor, platform or steps of any railroad or railway station, car, public building, hall, church, theatre, market, or any sidewalk immediately connected with said public places, be, and hereby is, prohibited."

Attest:
C. E. DAV--

No. 3.

HEALTH DEPARTMENT, OLD COURT HOUSE.

BOSTON, *May* 1, 1900.

DEAR DOCTOR,

You are hereby notified of the following changes in the Regulations of the Board, which go into effect May 15 :—

(1.) Pulmonary and laryngeal tuberculosis are now included in the list of diseases of which compulsory notification is required. After removal or death of the patient, the Board of Health will disinfect the premises.

(2.) Release of diphtheria cases.

(3.) Free examinations are made at the Laboratory of the Board of Health for physicians in the following: Tuberculosis, Diphtheria, Typhoid Fever, Influenza and other bacterial diseases and Malaria. For Veterinarians, free examinations in Glanders and Rabies are made.

Outfits for Tuberculosis, Diphtheria, Typhoid Fever and Glanders may be obtained at 38 druggists in various parts of the city. (Boston has about 500,000 inhabitants.)

By direction of the Board of Health,

C. E. DAVIS, JR.,

Secretary.

No. 4.

CONSUMPTION.—HEALTH DEPARTMENT.

Directions for Consumptives and Those Living With Them.

Consumption is caused by the bacillus of tuberculosis, a particular form of germ. This germ grows in the lungs of the consumptive patient in enormous numbers, and the material (called sputum or spit) coughed up by the patient contains a great many of them. When this sputum is allowed to dry in the room, it may become powdered and be blown about in the air. Any persons breathing this air in the room may take the germs into their lungs and after a time become consumptive.

This is the first danger to be guarded against. The patient should not spit upon the floor, carpet, wall, stove or anywhere except into a cup kept for the purpose. The cup should be one-third full of water and carbolic acid (see below, I.). The water keeps the sputum moist and the carbolic acid kills the germs. The cup should be emptied into the water-closet twice a day and carefully washed afterwards each time with carbolic acid (Solution I.) followed by boiling water. If paper or pasteboard cups are used, the cup with its contents should be burned and a new one substituted. This is the best plan. Handkerchiefs used by the patient should be boiled in water for half an hour by themselves and then washed each day. It is better to use worthless cloths and burn them, instead of boiling and washing. When away from home, the patient should spit into the handkerchiefs or cloths. These should not be carried loose in the pocket, but in a tobacco pouch or other waterproof receptacle. On returning home, the handkerchiefs should be boiled or the cloths burnt, and the pouch well washed with carbolic acid and water (see below, I.).

Great care should be taken by the patient to prevent the hands, face, and

clothing from becoming soiled with the sputum. The lips are particularly apt to become smeared with the sputum, and the hands also, when handkerchiefs are used. Both face and hands should be frequently washed with hot water and soap, followed by carbolic acid and water (see below, II.). The kissing of consumptive patients is dangerous, especially to children.

The second source of danger is in the fine spray thrown off by the patient from the mouth in talking, coughing, laughing, sneezing, spitting, etc. The germs are present in this spray, which floats about in the air and settles upon the furniture, etc.

The danger is not so great as from the dried sputum, but persons not having consumption run the risk of infection on this account if they remain long in a room used by a consumptive patient. No consumptive patient should sleep in the same room with anyone else.

The third source of danger is from clothing and knives, forks, spoons, plates, cups, etc., used by the patient.

These should all be boiled in water after use. The patient's clothing, night-robes, sheets, pillow-slips, etc., should not be mixed with the general wash of the family, nor sent to a public laundry, but boiled for half an hour and then washed by themselves at home. Articles of food, especially milk, should not be used by the family after standing for any length of time in the room used by the patient.

Consumption is by no means always fatal, and in the earlier stages recovery often takes place. The room occupied by the patient should be as large, airy and well lighted as possible. Carpets, curtains and upholstery should not be used. If already in use, they should be removed and disinfected. Floor rugs should be frequently taken up and exposed to sunlight for a day, and then swept or beaten in the open air and at intervals disinfected with steam. They should not be swept or beaten in the house. The floors, woodwork, furniture, windows, etc., should be wiped with a cloth wetted in a disinfectant solution, not swept or dusted. The bowl of the water-closet used by the patient should be washed each day with a disinfectant solution also. Male patients should not wear beard or moustache, but should be clean shaved.

If these directions are followed, but little danger of infection to the family will exist and the patient will be in good circumstances for recovery. The patient should have nourishing food, plenty of fresh air and light, and occupation suited to the general condition of the disease. The patient should avoid swallowing the sputum and should abstain from excesses of all kinds, alcoholic, etc.

Disinfectant Solutions.

I. For sputum cups, and for washing furniture, woodwork, metal surfaces, floors, etc.:

Carbolic acid, half pint; Water, five quarts (label "poison").

II. For washing hands and face:

Mix one quart of Solution I. with one quart of water (label "poison").

III. For steam disinfection and disinfection of rooms:

Apply at Boston Health Department, 11 Old Court House, Boston.

After the removal of a patient from the house or room, disinfection will be performed by the Board of Health. The householder must notify the Board of Health of the removal of the patient within twenty-four hours.

SAMUEL H. DURGIN, M.D.,
Chairman.

BOSTON, *May* 1, 1900.

FORMS USED IN CONNECTION WITH THE NOTIFICATION OF PHTHISIS IN MANCHESTER, AND REFERRED TO IN ALDERMAN McDOUGALL'S PAPER ON NOTIFICATION.

APPENDIX I.

Letter sent, with circular, to medical men, notifying the scheme and detailing fees :

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER.
14th May, 1900.

DEAR SIR,

I beg leave to draw your attention to the enclosed circular, and I would ask you, if you have not already done so, to notify to the Public Health Office cases of Phthisis, especially those in which you consider that the Sanitary Authority can give useful assistance in cleansing, &c.

It is often of great advantage to the Medical Attendant, and it is always satisfactory to the Sanitary Authority, to have an examination made of sputum collected from the case reported; or, indeed, from cases whether previously reported or not.

If the sample gives a positive result, this will be taken as equivalent to notification of the case, unless the Medical Attendant makes an express request to the contrary.

Tins, appropriate to the collection of sputum, will be forwarded on application.

Yours truly,
JAMES NIVEN,
Medical Officer of Health.

Circular sent with letter to Medical Men :

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER,
January 17th, 1900.

DEAR SIR,

I am requested by the Sanitary Committee to invite you to notify to the Health Office any cases of Tubercular Phthisis (Consumption) which may occur in your practice. The Sanitary Committee are desirous of obtaining as complete a picture as possible of the distribution of Phthisis in the City. They are also desirous of obtaining such information with respect to the circumstances determining infection as may assist them in their efforts to reduce the mortality from this disease.

On receipt of a notification from a practitioner, Dr. Harold Coates, of the Health Office, will visit the house, and will ascertain what measures of disinfection or of other precautions are necessary. These will then be carried out by the Corporation or by the householder, as occasion may require. The utmost pains will be taken to act in complete agreement with the Medical Attendant.

Notification of cases may be made on the enclosed forms. A fee of 2s. 6d. will be

paid for each case notified by a private Medical Attendant, unless the case has been previously notified by another practitioner, in which case a fee of 1s. will be paid.

The fee paid to Medical Officers of Public Institutions will be 1s.

In order to enable Medical Attendants to arrive at a diagnosis in doubtful cases as quickly as possible, the Sanitary Committee offers to practitioners the opportunity of having specimens of sputum examined at the College by Professor Delépine. All applications for such examinations must come through the Health Office, when vessels suitable for the collection and conveyance of sputum will be supplied.

In order that the difficult question of fees may be settled as far as possible, I beg to append a statement of the fees to which the Corporation have given their sanction.

Yours truly,

Medical Officer of Health.

The following scale of payments has been accepted by the Council :—

(1) For each report of a case not previously reported, when reported by a private medical attendant, 2s. 6d.
(2) For each report of a case previously reported from another source, 1s.
(3) For each report of a change of address of a phthisical case, the new address being reported, 1s.
(4) For each fresh case reported from a public institution, 1s.
(5) For each change of address reported from a public institution, the new address being reported, 1s.

CITY OF MANCHESTER.

Counterfoil for use of Medical Attendant.

Name of Patient

Age of Patient

Address of Patient

Name of Occupier, or Person in charge

Nature of Disease

Certificate forwarded to Medical Officer of Health at o'clock on the day of 190

CITY OF MANCHESTER.

MEDICAL CERTIFICATE OF TUBERCULAR PHTHISIS.

To the Corporation of the City of Manchester.

I hereby certify and declare that, in my opinion, the undermentioned person is suffering from Tubercular Phthisis.

Dated the day of 190 .

(*Signed*)

Address

Qualification

Institution

Name of the person suffering from the disease

Age of do. do. do. do.

Situation of the building wherein such person resides

Name of the occupier or other person having the charge, management, or control of the building or room in which the patient resides.

Sent to private practitioners *re* taking a specimen of sputum, on receipt of certificate notifying a case :

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER,
19 .

DEAR DR.

I am obliged to you for your notification of a consumptive patient living at

Dr. will call upon the patient at an early date to make arrangements as to disinfection, etc. May I ask if you would have any objection to his collecting a specimen of the expectoration for bacteriological examination, as we are desirous of ascertaining the degree of infectiousness of the cases notified to us.

Of course I should be glad if you would yourself collect a specimen and send it to Professor Delépine for examination, and I shall be pleased to send you a tin for the purpose.

The tin should not be kept longer than 24 hours.

If I do not hear from you to the contrary, Dr. will make arrangements for examination of the sputum, and the result will be communicated to you as early as possible.

Yours faithfully,
Medical Officer of Health

When a medical certificate is received, particulars thereon are entered upon this form, which is then handed to the Visiting Medical Officer. After visiting the case the Medical Officer fills in the information gained, under the proper question :

CASES OF CONSUMPTION INVESTIGATED.

1. Sanitary District No.
2. Address
3. Name Sex Age
4. Medical Attendant Institution
   Health Visitor
5. Date of Notification Date of Visit
6. How long Ill Date of Death
7. How long in present house Isolation
8. Owner Agent
9. Condition of House : Through, Back-to-back—No. of Rooms—Clean, dirty—Ground Floor, Damp, Dry—Cellared, Not Cellared—Overcrowded, Not overcrowded—Living Room, Well, Badly Lighted.

   Bedroom : Damp, Fire-place, clean

   Condition of the Yard : Large, Small—Open, Confined—Flags well set, Broken, Loose

   Drains : Pipe—Brick—Lately Blocked—Properly Trapped—Inoffensive

   Condition of the Privy and Ashpit : Class, Pail, Midden, W.C.

   Adjoining Kitchen or Scullery, if not, distance from

   If Pail, Urine Guide Good or Defective—Floor Dry, Wet—Sunk—Free from Nuisance—Emptying required

10. If disease not contracted in present house, give previous addresses, and how long in them

11. Condition of previous houses

12. Any cases of Consumption at these addresses before the present tenants

13. Other members of the family, with ages

14. Have any members of the family been consumptive, either on the Father's or the Mother's side. Give particulars

15. Are any other members of the family ill at present, if so, in what manner

16. Give particulars of the physique of the remaining members of the family

17. Was patient known to have been intimate, or to have associated, with any consumptive patient some years before, and at what period
    - (*a*) Member of family
    - (*b*) A relative
    - (*c*) A companion
    - (*d*) A workfellow

18. Occupation. If the patient had left school or workshop on account of illness, please give date

19. Character of work

20. Character of workshop

21. Is patient narrow on the chest and feeble, or strong

22. Has patient sustained any injury or suffered from any weakening disease before contracting consumption

23. Has patient had a hard life in any way

24. Personal habits

25. If the disease "Consumption of the Bowels," give milk supply for 6 months before the commencement of the illness

26. Do the family wish the house disinfected

27. Precautions taken at school or place of work

28. Source of infection

29. Investigations made

30. Hospital

31. Examination of sputum, etc.

32. Materials supplied

33. Precautions taken—
    - (*a*) Precautions handed to householder
    - (*b*) Precautions handed to patient
    - (*c*) Personal instructions given in the precautions required
    - (*d*) Efficient cleansing carried out

34. Medical attendant (new)
35. Change of address
36. Result
37. GENERAL REMARKS

(Signature)

Date

Post-card supplied to patient to notify change of residence:

, 1900.

I have to inform you that I am leaving the above house on
and my new address will be

(Signature)

Sent to tenant or patient to make an appointment:

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER.
19 .

SIR, or MADAM,

Will you kindly write and inform me on what day you will be at home between the hours of 10 A.M. and 4 P.M.

I enclose a stamped and addressed envelope for a reply.

Yours faithfully,

Medical Officer of Health.

Sent to owner of property where a *death* from Phthisis has occurred, for permission for the Sanitary Authority to cleanse house, IF DIRTY.

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER.
19

DEAR ,

There has been a death from Consumption at
and I am informed that the house is in a dirty condition.

I am of opinion that, for the protection of the health of the inmates, this house should be thoroughly cleansed and disinfected.

With your permission, I will send men to do this work at the Corporation expense.

I shall be glad to hear from you on the matter.

Yours faithfully,

Medical Officer of Health.

N.B.—All houses, however, are disinfected after a death from phthisis, whether clean or dirty.

Sent to owner of property in which a consumptive patient is *living*, for permission for the Sanitary Authority to cleanse house, IF DIRTY.

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER.

DEAR 190 .

There is a case of Consumption at ,
and I am informed that the house is in a dirty condition.

I am of opinion that, for the protection of the health of the inmates, this house should be thoroughly cleansed and disinfected.

With your permission, I will send men to do this work at the Corporation expense.

After the disinfecting has been done, I will endeavour to see that the house is kept clean by the tenant.

I shall be glad to hear from you on the matter.

Yours faithfully,
Medical Officer of Health.

N.B.—All houses, however, unless recently cleaned, are disinfected either by the Corporation or by the tenants.

Sent to owner of property, after *removal* of a consumptive patient, for permission for the Sanitary Authority to cleanse house, IF DIRTY.

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER,

DEAR 190 .

There has been a case of Consumption at
but the patient has now been removed (to hospital), and I am informed that the house is in a dirty condition.

I am of opinion that, for the protection of the health of the inmates, this house should be thoroughly cleansed and disinfected.

With your permission, I will send men to do this work at the Corporation expense.

I shall be glad to hear from you on the matter.

Yours faithfully,
Medical Officer of Health.

N.B.—All houses, however, are disinfected after removal of the consumptive person by one or another method, as circumstances may require.

Sent to owners of property after *removal of tenants*, for permission for the Sanitary Authority to cleanse before any re-decorating is done:

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER.

DEAR 190 .

There has been a case of Consumption at
but I am informed that the tenants have now removed.

Before the house is again occupied, no doubt you will be doing some beautifying, and before this is done it is very desirable to remove all infective material, and thus protect the health of the ingoing tenants.

With your permission, I will send men to do this work at the Corporation expense.

I shall be glad to hear from you on the matter.

Yours faithfully,
Medical Officer of Health.

Instruction to Sanitary Inspector to visit and see that precautions are being carried out, when periodical visit (but not cleaning) is due:

CASES OF CONSUMPTION.

Please visit the above-mentioned house, and see that this house is kept *rigorously clean and free from dirt and dust, also that the patient is carrying out strict personal precautions, and report after each visit.*

Sanitary Inspector.

Date

Report handed in by Sanitary Inspector or female Health Visitor after a periodical visit, when cleaning is not due:

CASES OF CONSUMPTION.

I have this day visited the above-mentioned house, and find that this house is kept *rigorously clean and free from dirt or dust, also that the patient is carrying out strict personal precautions.*

Health Visitor.

Date

Sent to Female Health Visitor to instruct her to visit a case, and secure cleaning by the people, periodically:

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER.
19 .

MADAM,

There is a case of consumption at , and I shall feel obliged if you will arrange to visit this house and see that it is kept rigorously clean and free from dust.

At each visit please fill up one of the printed report forms, and post to me without delay.

If the patient or the family should leave this house at any time or death takes place, please let me know at once. In case of removal, kindly obtain the new address where the patient has gone to reside and forward to me.

Yours faithfully,

Medical Officer of Health.

P.S.—Please get the house (or rooms) cleaned through on (date) and every three months afterwards. (Esmarch's method is understood.)

Sent to Female Health Visitor, intimating moribund case, to notify Medical Officer when death occurs. (Seldom used):

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER.
18 .

MADAM,

I have to inform you that there is a very advanced case of Consumption at

Will you kindly keep the case under observation, and if the patient should die

let me know at once so that I may give the necessary instructions to protect the other members of the family.

If the patient should leave this house please notify me at once.

Yours faithfully,

Medical Officer of Health.

Sent to Female Health Visitor to supervise disinfection by the Sanitary Department, and subsequently visit, and get the people themselves to clean, periodically:

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER.

1 .

MADAM,

The owner has consented for the Corporation to cleanse and disinfect the house .

I enclose you, herewith, the report form. Will you kindly inform the tenant that the disinfecting will be done on , the day of . Please superintend the disinfection of the house; fill in the times of arrival and departure of the men, on the form; and return by early post the day after the disinfection has taken place.

Then I shall be obliged if you will arrange to visit this house, and see that it is kept rigorously clean and free from dust.

At each visit please fill up one of the printed report forms, and post to me without delay.

If the patient or the family should leave this house at any time, or death takes place, please let me know at once.

Yours faithfully,

Medical Officer of Health.

Sent to Female Health Visitor to supervise disinfection by the Sanitary Department, where no subsequent visiting is required, as where death has occurred:

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER.

1 .

MADAM,

The owner has consented for the Corporation to cleanse and disinfect the house .

I enclose you, herewith, the report form. Will you kindly inform the tenant that the disinfecting will be done on , the day of . Please superintend the disinfection of the house; fill in the times of arrival and departure of the men on the form; and return by early post the day after the disinfection has taken place.

Yours faithfully,

Medical Officer of Health.

Sent to Female Health Visitor to arrange for house to be cleaned by the people themselves, and inform Medical Officer of the date. (Seldom used):

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER.

MADAM,

Will you kindly call at , and arrange for the house to be thoroughly cleansed by the tenant, in accordance with the instructions already issued to you, and let me know on the enclosed post-card what day the work will be done.

When the work is done to your satisfaction, kindly let me know.

Yours faithfully,

Medical Officer of Health.

Sanitary Inspector reports hereon condition of house where Medical Officer has not visited, or in special cases, as removals, etc.:

(DEATHS FROM) PHTHISIS.

REPORT *re* CLEANSING AND DISINFECTION OF HOUSES.

Inspector District No.
Name
Address
Sex Age (Date of Death)
Hospital Date of Admission
Date handed to Inspector

1. Is this house dirty, and do you consider that it ought to be cleansed and disinfected by the Corporation?
2. Owner's or Agent's name and address.
3. If dirty, particulars of rooms to be cleansed and disinfected to be stated.
4. If the house is clean, the walls of all rooms in any way occupied by the patient must be rubbed down with dough, and the floors, furniture, and bedding, etc., washed. Other rooms which you consider to require cleansing must be dealt with in a like manner.
5. Has any other case of Consumption affecting the lungs, brain, bowels, glands, or bones occurred in the family?
6. Any sanitary defects in the house?

SPECIAL INSTRUCTIONS.—Every room in any way occupied by the patient must be cleansed either by the Corporation or by the tenant.

Sanitary Inspector.

Date of Visit

Particulars of disinfection required are entered hereon, and then transmitted to the Disinfecting Department. After the work has been inspected by the Sanitary Officer, he signs this form. When the Female Health Visitor supervises or inspects the work the form is signed by her :

DISINFECTION OF HOUSES.

INSPECTOR'S REPORT.

Inspector District No.

at

Date of Entry Work to be done

The following disinfection is required at the above-mentioned house, after the recovery or removal to Hospital of the Patient :

Parlour

Sitting Room

Living Room

Scullery

Lobby

Bedrooms

Bathroom

Landing

Staircase

Closet

The following articles of furniture, etc., also to be washed with the solution of Chlorinated Lime :—

Telephoned Oldham Road Yard

N.B.—The Sanitary Inspectors to superintend the work and to see that the Disinfectors do not reduce the strength of the solution by adding water.

I have inspected the above-mentioned house after disinfection, and certify that the work referred to in the Schedule has been thoroughly carried out.

Time men arrived at house
Time men completed work

Sanitary Inspector.

Date

All cleansing that has been done, whether by the Sanitary Department or by the people themselves, is reported in detail on this form by the Sanitary Inspector or Female Health Visitor.

This form is handed to the Sanitary Inspectors when cleansing by the people is due :

TUBERCULAR PHTHISIS.

REPORT *re* CLEANSING AND DISINFECTION OF HOUSES AND ROOMS IN CASES OF CONSUMPTION.

Inspector District No.

Name of patient

Address

Sex Age Date of Death

Hospital Date of Admission

Date Handed to Inspector

QUESTIONS.	ANSWERS.
1. Number of rooms disinfected? Details of	
2. Whether disinfected by Corporation, or people themselves?	
3. Walls cleaned by dough, milk of lime, or chloride of lime solution?	
4. Ceilings : — White - washed or lime-washed?	
5. Floors : — Scrubbed with soap and water, or washed with chloride of lime solution?	
6. Bed Clothes :—Taken to Oldham Road, or washed?	
7. Mattress :—Taken to Oldham Road?	
8. Curtains, Carpets, or Rugs :—Taken to Oldham Road?	
9. Personal Clothing of Patient :—Taken to Oldham Road, or washed?	
10. Furniture and all other Woodwork :—Washed with soap and water, or by Corporation men?	

SPECIAL INSTRUCTIONS.—Every room in any way occupied by the patient must be cleansed as per this form.

Date of Disinfection

Disinfection Supervised by

Signature

HANDBILL SENT TO EVERY HOUSE IN THE CITY AND DISTRIBUTED BY HEALTH VISITORS.

This handbill should be nailed up for reference.

PRECAUTIONS AGAINST THE COMMUNICATION OF CONSUMPTION.

1. Consumption is an infectious disease, liable to be communicated more particularly in damp, badly ventilated, and badly lighted houses and workshops.

2. It is usually communicated by the matter coughed up by consumptive people, which get dried and dispersed as dust, thus reaching the lungs of those susceptible to the disease.

3. Such matters should, therefore, never be allowed to get dry. For that reason they should not be spat on the floors of a house, but either into pieces of rag or paper, which should be at once burned, or into a hand-vessel containing water. This vessel should be emptied into the drains outside the house once a day, and then scalded and re-charged with water.

4. Everyone affected with a chronic cough should take the same precautions as a consumptive person.

5. The same precautions should be observed in a workshop as at home.

6. Consumptive people should not spit into a pocket handkerchief, as both the handkerchief and their clothes are thus made infectious.

7. No one should spit on the ground inside any building or in a public conveyance.

8. The bowel discharges of consumptive people should be disinfected by being passed into a 15 per cent. solution of carbolic acid, or simply into water, and the vessel, when emptied, should be at once scalded. Soiled clothing should be at once removed, disinfected, and afterwards boiled.

9. When it is settled that anyone is consumptive the house should be thoroughly disinfected, and the patient should be thenceforward confined to certain parts of the house. On a request made in writing to the Health Office disinfection will be carried out by the Department free of charge.

10. The rooms occupied by a consumptive person should be kept well ventilated, and well lighted. This will aid greatly in destroying the infection.

11. No one is more liable to inhale the dust from matters coughed up than the consumptive himself. The removal of infectious matter is, therefore, calculated to promote his recovery. Moreover, if these precautions are strictly carried out he need not be a source of danger to anyone.

12. It is the duty of the attendant to see that the above precautions in regard to the phlegm and discharges are observed, and also to see that every obstacle to sufficient lighting and ventilation is removed.

13. In case of death the house will be disinfected by the Sanitary Authority, if this is desired. A new tenant should not enter a house previously occupied by a consumptive person until such house has been thoroughly disinfected.

14. Amongst the agencies which act powerfully in causing Consumption are damp dwellings and workshops, overcrowding, defective ventilation, occupations which involve the inhaling of irritating dust, and alcoholic excess. These should be avoided.

15. The milk from consumptive cows is very dangerous, especially to children. All milk should be boiled before use. As many animals suffer from Consumption all meat should be thoroughly cooked.

Public Health Office,
Town Hall, Manchester,
May 28th, 1894.

Medical Officer of Health.

Handed by Medical Officer to patient or relative:

INSTRUCTIONS TO PERSONS SUFFERING FROM CONSUMPTION.

1. The safety of your family and of your workmates, as well as your own chances of recovery, depend on your following these rules.

2. The material which you cough up and spit (the sputum) contains the infection of consumption. If this is allowed to become dry and to get broken into dust, such dust when inhaled will produce the disease in others, and will also cause fresh disease in your own lungs.

3. Great care must therefore be used, so that the sputum is not discharged on any spot or into any substance on which it can be dried and subsequently broken into dust.

4. It must, therefore, not be discharged on the floor or walls of any living room, workshop, meeting room, theatre, or other confined place in which people assemble. It must not be discharged into a pocket handkerchief carried in the usual manner, since it readily dries in such a situation, to that not only are the clothes infected, but, when the pocket handkerchief is again used, a cloud of infective dust is scattered around you.

5. There are various ways in which this danger may be avoided.

At home you should spit into a piece of paper or clean rag, carefully clean your mouth with it, and then throw the soiled rag or paper on the back of the fire.

If there is no fire you should spit into a cup containing water, which must be emptied once a day into the drains outside the house, and then thoroughly cleansed with boiling water before being again used.

Outside the home you should carry a number of pieces of soft tissue paper, preferably oiled, and when you must spit use one of these, folding it after use so that the sputum is right in the centre of it, when it will not dirty the pocket. Use one pocket for the unused papers and another for those which have been used.

Or you may carry a pocket spittoon charged with moistened blotting paper. This may be readily obtained at any chemists, or made. It is essential that the lid should fit tight, and that the spittoon should be kept clean.

6. All persons who have a chronic cough and spit should carry out the above precautions.

7. Consumptives should not kiss on the lips.

The eating utensils which they have used should be at once thoroughly cleansed before further use.

8. If these precautions are strictly observed a consumptive person runs no risk whatever of infecting others, and adds considerably to his own chances of recovery.

9. The sleeping room of a consumptive should be kept rigorously clean. If, by any chance, the pillows or bed clothes have been soiled with sputum they should be at once disinfected by steam, or washed with boiling water.

Dust should not be allowed to accumulate anywhere in the bedroom. The room should be kept well aired, and the bedroom window should, whenever possible, be kept slightly open. There is no reason why one other person should not occupy the same room, though not the same bed, if the above precautions are carefully carried out.

10. Persons who have contracted consumption, or who have a family history of the disease, should not live or sleep in a room which is damp, crowded, badly lighted, or badly ventilated.

11. It will often happen when a consumptive person's attention is first called to these rules that a considerable amount of infective dust will have collected in the rooms which he has occupied. These must be carefully disinfected.

Articles, including wearing apparel, carpets, hangings, bed clothes, and

mattresses, which admit of such treatment will be disinfected at the Corporation Station free of charge. Articles which admit of washing with boiling water may be so washed. Other articles, as well as the floor, walls, and ceiling, should be thoroughly cleaned down with a disinfectant, and the Corporation will do this work if requested. Where the work is done by the householder, directions will be given in each instance of the precise degree and kind of disinfection necessary.

Having once got the rooms quite clean, it becomes easy, though necessary, to keep them so. In order to effect this, the floors and skirtings of rooms used by consumptive persons should be thoroughly cleansed with soap and water at least once a week, and at all times the rooms should be kept free from dust. It is always desirable in dusting a room to moisten the floor with tea leaves or otherwise, and to use a damp duster to other parts of the room. In this way one makes sure of not scattering infectious dust in the air of the room. This is especially necessary in a room occupied by a consumptive whose lungs are, moreover, likely to be injured by the dust left in the room.

12. The walls ought to be rubbed down with dough every three months.

The most essential thing in preventing the spread of this disease, and in aiding the recovery of the consumptive person, is extreme cleanliness in his person and in the living and sleeping rooms used by him, with special attention to the points mentioned in this paper.

JAMES NIVEN,
April 20th, 1900. *Medical Officer of Health.*

SPECIAL NOTE.—Attached hereto is a post card, to be sent if you change your address, as in case you leave the house, it is very desirable that all infective material should be removed before the house is again occupied, and also that the Medical Officer of Health should be kept aware of your address.

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER,
January 22nd, 1900.

LETTER SENT TO THOSE IN CHARGE OF WORKSHOPS ADVISING AS TO PRECAUTIONS AGAINST INFECTION, AND REQUESTING THAT THE NOTICE GIVEN BELOW SHALL BE SUSPENDED IN THE WORKSHOP.

DEAR SIR OR MADAM,

It is now generally recognised that consumption is a communicable disease, and that the manner in which it passes from one person to another is as follows :—

The sputum, or in other words the matter coughed up by the consumptive person, contains the infectious material. If this matter is discharged on the floor of a confined space where it can become dry and be broken into dust, the dust is inhaled by others, and causes their lungs to be attacked by the disease.

Further, it is very difficult in many instances to say when persons afflicted with a chronic cough and spit are suffering from chronic bronchitis merely, or whether the affection is really consumption.

There is no doubt that consumptives can and do communicate consumption to their fellow-workers in the manner indicated, especially when the work is of a dusty character, or, on the other hand, is carried on in confined spaces.

The chain of infection in the workshop can be interrupted in several ways. The most important of these is as follows :—

The sputum can be rendered harmless by simple precautions. A person at

work should not spit on the floor. Nor should an ordinary pocket handkerchief be used to spit in, since this becomes impregnated with infectious matter which dries on the handkerchief. When the handkerchief is pulled out of the pocket the dried particles are scattered about and convey the infection. Moreover, the clothes become infected, and so contaminate clean handkerchiefs.

What is needed is that the consumptive or other person affected with a chronic cough and spit should spit on a piece of paper or rag, and forthwith burn it. If this is not practicable, the paper or rag should be deposited in a vessel charged with water or a solution of carbolic acid. The latter is preferable, because the frequent cleansing of the vessel may then be dispensed with.

Pocket handkerchiefs of paper useful for this purpose may be obtained at 5*s.* 6*d.* per 1000. If these are preferred, each handkerchief should only be used once, and should be rolled round the sputum. The clean handkerchiefs may then be carried in one pocket and the dirty ones in another.

With a view to impressing on workpeople the need for effectual precautions, I am instructed by the Sanitary Committee to send you copies of a placard, which they would be obliged if you would suspend in your workshops.

I am instructed to add that, if the above precautions are carried out, no more danger need arise from a consumptive than from a healthy person.

Further, in order to ensure the maximum of safety, it is needful that workshops should be cleansed with water at frequent intervals. This applies more particularly to the floors.

Yours faithfully,

Medical Officer of Health.

NOTICE AS TO SPITTING AND CONSUMPTION.

Spitting on the floor or walls of a workshop is highly dangerous to the health of fellow-workers as well as to the person who does it. It is often dangerous also to the users of goods made therein. Consumption, Diphtheria, and other fatal diseases are thus communicated.

Those obliged to spit should use a piece of paper, which should be at once burned. Or, if it cannot be burned at once, it should be folded up in such a way as not to soil the pocket, and burned as soon as possible. No paper should be used twice. Ordinary pocket handkerchiefs should not be used, since they scatter infection.

Public Health Office,
Town Hall, Manchester,
November 2nd, 1899.

Medical Officer of Health.

Letter sent to proprietors and tenants of inns, public-houses, etc., *re* preventing infection, in connection with the suspension of the notice given below in the public rooms:

PUBLIC HEALTH OFFICE,
TOWN HALL, MANCHESTER,
January 22nd, 1900.

DEAR SIR,

It is now generally recognised that consumption is a communicable disease, and that it is communicated in the following manner: The matters coughed up by consumptives contain the infectious material. If this matter is discharged on the

floor of a confined space where it can become dry and be broken into dust, the dust is inhaled by others, and causes their lungs to be attacked by the disease.

This is especially liable to occur in the public rooms of inns and public-houses.

The danger requires to be met in two ways: By preventing as far as possible the floors and walls of the public rooms from being contaminated with spittle, and by frequent cleansing of the floors and walls of public rooms at regular intervals with soap and water.

There is also considerable danger from the use of ordinary pocket handkerchiefs by consumptives, as infectious matter deposited in these gets dried and scatters as an infectious invisible cloud every time the handkerchief is used.

I am requested, therefore, by the Sanitary Committee to ask you by every means in your power to endeavour to prevent infection being conveyed in your public rooms, and, in particular, to suspend in your public rooms the enclosed placard.

You will observe that no mention is made of spittoons in the placard. The ground around spittoons is so often found soiled with spittle that they cannot be relied upon as a safeguard.

Yours faithfully,

JAMES NIVEN,

Medical Officer of Health.

CONSUMPTION.

NOTICE AS TO SPITTING IN PUBLIC HOUSES.

Do not Spit on the Floor or Walls of the Public House. Those who do so endanger the lives of their fellows. If obliged to spit, go outside. Do not use an ordinary pocket handkerchief. It is by means of dried spittle that Consumption is commonly spread, and this is very liable to be deposited on the floor of the Public House. Avoid spitting inside. If there is a fire you may spit in a piece of paper which should be at once burned.

JAMES NIVEN,

Medical Officer of Health.

Public Health Office,
Town Hall, Manchester,
November 2nd, 1899.

NOTICE AS TO SPITTING USED IN COMMON LODGING HOUSES.

Do not spit on the floors or walls. This disgusting habit causes others to take Consumption.

JAMES NIVEN,

Medical Officer of Health.

Public Health Office,
Town Hall, Manchester,
October 25th, 1899.

APPENDIX II.

INFECTION IN WORKSHOPS.

A demonstration of the infectivity of houses occupied by consumptives is applicable equally to workshops, in which indeed the infective condition will usually be intensified. Still more is this the case with common lodging-houses and public-houses. Two requirements of workshops need to be emphasised :—

I. That persons affected with a chronic cough should spit, not on the floor or walls of the workshop, but into a pocket spittoon or suitable handkerchief.

II. That many workshops require to be periodically cleansed with a disinfecting solution, such as a 2 per cent. solution of chloride of lime. Brushing is quite inadequate, and even washing is not to be entirely relied upon, though it is a step in the right direction.

In order to emphasise these requirements, I give—

A. A transcript from the reports of the Assistant Medical Officers relating to cases in which patients had been exposed to infection in the workshops at such periods as to suggest that the disease was contracted from the absence of the precautions mentioned.

B. We have found that the most common period between exposure to prolonged infection and the beginning of symptoms is about a year. Taking, then, a period extending from six months to two years before the beginning of symptoms, I have had the place and character of occupation of phthisical cases at that period of their history excerpted from the records. These poor persons frequently change their employment, and some such rule is necessary when we are considering the workshop in which persons were engaged when they contracted phthisis. Then the list of such occupations is examined to see whether any particular places are specially indicated. The period over which our researches extend is too short for this method to yield very much, but something may be gleaned.

I will now give the particulars under "A."

A. Patients who have been exposed to Infection while following their Occupations.

I. *Warehouses in the Grey Cloth trade.*

Much dust (china, clay and sizing) is given off while handling the cloth. In most of the warehouses a chronic cough appears to be very common. The men spit on the floor.

	Case.	
1899.	(20)	Ill 1 year (?). Worked for 4–5 years near a man who died of phthisis 3 years ago.
	(45)	Ill 5 years. Worked with a man who died of phthisis 6 years ago.
	(60)	Ill 6 years. Worked at the same press (maker-up) as a man who died of phthisis 7 years ago.
	(68)	Ill 7 years. Several of the warehousemen have died of phthisis during the last 9 years.
1900.	(189)	Patient remembers 3 of his fellow-workers who have left on account of cough and weakness, and 1 has since died. Has worked here 9 years. Illness began 1 year ago.
	(213)	Ill 4 years. A workfellow died of phthisis about the time patient's illness commenced. Two others are now attending the Consumption Hospital.

CASE.

1900.

(318) Ill 3–4 years. Has worked here 10 years. Two fellow-workers have died of phthisis since he came here, and another is now very ill of phthisis. Three others are said to be away with bad chests.

(319) Has worked with many consumptives, and knows several who have died. Workmen spit anywhere about the floor.

(86) A man left in Dec. 1899 on account of having phthisis (case 318, *supra*). He had been ill 3 years, during which time patient was working near him. Patient's illness began about September, 1899. There have been several cases here.

(87) Ill 8 years. Two of his fellow-workers at the place where he was working when his illness began "had phthisis," and many others "had bronchitis."

(123) Ill 1 year. This patient did not know that he had ever worked near a consumptive person, but since visiting him I have seen a man who has had phthisis for 8 years, and who has worked near this patient for 5 years. They were often handling the same pieces of cloth.

(1191) Has been ill nearly two years. For 5 months, up to 2 years ago, worked next but one to a woman who had phthisis, and who spat freely on the floor.

Other warehousemen tell of working where there have been cases of "chronic cough," "bad chests," etc., although they cannot say that these were cases of phthisis, but there is little doubt that many of them were phthisical patients.

1899.

(226) Has been ill 2 years. A man left on account of having phthisis 8 years ago. Several others have left with a bad cough and spit.

(30) Patient has been ill 5 years. Six years ago he worked with a man who had a bad cough and spit, and who was thin.

(157) Patient does not know of any who were said to have phthisis, but several had a chronic cough and spit.

1900.

(88) A warehouseman for 18 years. Has been ill 5 years. He has known many workers with "bronchitis" and "bad cough." The beginning of his illness was an attack of influenza 5 years ago.

(55) Has worked here 9 years. Ill 1½ years. Patient does not know any one who had consumption, but many of the warehousemen suffer from "asthma" and "bronchitis," and there is always some one away from work on account of having a "bad chest."

Women and Girls employed in Garment-making (Shirts, Dresses, &c.).

1899.

(39) A machinist. From 1894–1896 worked on the next machine to a woman who had phthisis. Illness of case 39 began in 1896.

(74) Machinist. Ill 1 year. Worked near a woman who has had phthisis for 2 years. Another girl from this workshop is at Bowdon suffering from phthisis. Several girls have left on account of ill health.

(105) Ill 4 years. For 4 years worked with a girl who went to Bowdon 4 years ago with phthisis. Three or four other girls in another room of this workshop are attending the Consumption Hospital.

(330) Ill 2–3 years. Where patient worked there were 3 girls who had phthisis, and 1 of these died. They spat about the floor.

1900.

(628) A dressmaker. Ill 7 years. Six years ago she left a shop where she had worked for 2½ years, and where the mistress had discharging tuberculous glands and a cough.

(902) A mantlemaker. Until 2 years ago 1 patient worked next to a consumptive, and had done so for 2 years. Patient has been ill 1½ years.

CASE.

1900.

(279) A machinist. Ill 1 year. Several girls have left on account of ill health. Three others besides this case are suffering from phthisis, and are attending the Consumption Hospital.

(944) Ill 1 year. Worked in the same room as a patient who died of phthisis 2 years ago.

(1014) Shirtmaker. Ill 2 years. Two girls died of phthisis about 3 years ago who had worked at the same table as patient for several years. One of them was constantly spitting on the floor.

(1186) Three years ago patient worked next to a girl who had phthisis. Patient has been ill 2 years.

(1198) A corset maker. Ill 3 months. A girl who worked near patient left 6 months ago on account of having phthisis. This girl used to spit in her handkerchief and on the floor.

House Decorators.

1899.

(149) When this man had occasion to strip the paper from the walls of a room, he simply tore it off as it was, without previous wetting. Walls that were whitewashed he brushed down with a dry brush before re-whitewashing. There is no family history of tuberculosis, and careful inquiry failed to reveal any other source of infection.

(192) This man worked in the same way, and no other source of infection could be traced.

(256) This man stated that many of the houses he went to clean and white-wash were very dusty and dirty. He swept the walls with a dry brush before whitewashing, and this used to fill the air with dust. He was very strong and healthy before taking up this occupation, and his health began to fail when he had been doing the work for 9 months. He is now unable to work, and has well-marked phthisis.

1900.

(374), (12), (23) These 3 men give a similar account of the way in which they worked and stated that a good deal of dust was produced.

(227) This man's wife said that her husband often complained of the dust caused by stripping the paper, while dry, off the walls of dirty houses.

(229) This man said he had "stripped scores of houses." He pulled the paper off dry, and this caused a good deal of dust.

On the above section it may be observed that such workmen may also carry phthisis into houses which they renovate, and that complaints have reached the Medical Officer of Health of spittle being left by house cleaners. In the same way phthisis may be carried into homes by means of garments from infected workshops.

Cases at one Dyeworks.

There have been 9 cases of consumption notified among the men employed at the above dyeworks. In two of these cases infection had occurred before the men went to work there, but the other seven were apparently infected at these works.

The above works are now disused.

1900.

(623) m. 17. A clerk. Ill 1 year. Two years ago went to work next to a clerk who had phthisis, and worked next to him for a year.

(816) m. 43. clerk. Two years ago worked next to a man who had had phthisis for 4 months. Patient has been ill 14 months.

(856) m. 37. Steel smelter. Four years ago a work-fellow died of phthisis after an illness of 3 years. Patient has been ill about 4 years.

Miscellaneous.

CASE.

1900.

(901) f. 38. Carding-room hand in cotton mill. Ill 3 years. Up to two years ago had worked with a consumptive for 4 years.

(351) m. 38. A draper in a large shop. Has been ill 6 years. He worked with a man who died of phthisis 6 years ago.

(1119) m. 38. Brushmaker. Worked at the same place as a consumptive who died 6 years ago. Patient has been ill 6 years.

(190) m. 19½. Flannelette raiser—very dusty work. Many of his fellow-workmen had bad cough, and one he knows had phthisis.

(200) m. 24. This patient did not know of any one who had phthisis, but other cases have been notified from the same workshop, namely: (282), 1899, m. 22, ill 1 year; (642), 1900, m. 24, ill 6 months; (715), 1900, m. 45, ill 6 months.

(280) m. 26. Baker. Patient knows of several of his fellow-workmen who have had baker's cough, and 2 have died of phthisis.

(281) m. 32. Printer. There have been 4 or 5 other cases in this workshop.

(1157) m. 28. Bricklayer's labourer. For 7 years, ending 9 months ago, patient has worked with a man who had phthisis. Patient has been ill 3 months.

(1168) m. 36. Bricklayer's labourer. Ill 6–8 months. For 7 months, ending 2 years ago, he worked with a man who had a bad cough with thick yellow sputum.

(13) m. 45. Labourer at a tarpaulin works. Patient has been ill 2 years. Left work on account of illness 1½ years ago. Three of his fellow-workmen have left work on account of phthisis before he left, and many others had a chronic cough. The workshop is said to be badly ventilated, and there is a good deal of smoke produced in connection with the work which makes the men spit and cough. They spit on the floor. There have been 2 other cases amongst the workpeople at these works.

(1072) m. 30. Coremaker. Before his illness patient worked for over a year with a man who had phthisis. Patient has been ill 2 years and tubercle bacilli are present in his sputum, but, until now, he was unaware that he was suffering from phthisis.

(1234) m. 40. Fitter in machine-shop. Ill 6 months. Worked for 6 months, ending a year ago, very near a consumptive.

(110) m. 40. A machineman in a large ironworks. His illness began with hæmoptysis 7 years ago. Eight years ago, a man who had worked with patient on the same machine for 3 years died of phthisis.

(64) f. 22. Linotype works. For 6 years worked at the Linotype Co.'s Works in Hulme which were closed about 2 years ago. These workrooms are said to have been overcrowded and badly ventilated. There were two girls who worked here with patient, who were suffering from phthisis. Patient has been ill 2 years.

(310) m. 40. A stoker at Bradford Gas Works, Manchester. There have been three cases amongst the stokers here. Patient has been ill 2 years.

(967) m. 55. Stoker at gas works. Ill 3 months. For the last 2 years has worked near two consumptives, who spat freely on the floor.

(977) m. 43. Velvet finisher. Three years ago there were several men working near patient who were consumptive.

(1062) m. 41. Stonemason. A fellow-workman died of phthisis 15 months ago after an illness of 2–3 years, during which time patient worked with him. Patient has been ill 2 years.

1900.—(638) m. 56. Stonecarver. Ill 2 years. Many of his fellow workmen have had consumption.

N.B.—*A complaint has just been made by a patient (a stonemason) that at one shed in which he worked—used mostly in wet weather—there was overcrowding and want of ventilation.*

CASE.

1899.—(385) Stonemason. Has worked with several men who had consumption.

1900.—(1123) m. 40. Stonemason. Ill 1 year; probably longer. A work-fellow died 3½ years ago, who worked opposite to patient, and whose expectoration was very offensive.

1899.—(421) m. 52. Grinder. Ill 6 years. Several of his fellow-workers have died of phthisis. Other cases have been notified who are at the same works, namely: (391), 1899, m. 55, ill 1 year; (480), 1900, m. 47, ill 1 year; (523), 1900, m. 21, ill 4 years, not at these works for 2 years; (530), 1900, m. 28, not at these works for 8 years; (675), 1900, m. 19, ill years.

1900.—(480). m. 47. Grinder. Ill 1 year; at the same works as case (421).

1900.
- (42) Grinder. For 6 years previous to his illness he worked on the next stone to a man who then left off work because he had phthisis.
- (77) Grinder. Worked for 2–3 years with a man who had to leave on account of phthisis. Many others ill with a chronic cough.
- (34) Grinder. Many of the workmen here suffered from a bad cough and spit.

1900.—(756). m. 45. About 18 months before his illness began he went to work in a place where there were three men with "stonemasons' cough."

In the following 568 cases the occupations are given of consumptives at the probable time of infection as previously mentioned. The particular workshops in which they were then working do not admit of classification, but form the basis of the following observations.

Engaged in gasworks, of whom 4 were stokers	8
Drivers, and engaged in stables	15
Engaged in cotton mills	47
Workers in iron, tin, brass, and copper	76
Workers in wood	20
Velvet, fustian cutting, etc.	12
Warehousemen	54
Dyers and bleachers	14
Sewing machinists, etc.	45
Tailors, etc.	27
Rubberworks	17
Umbrella makers	6
Brokers and upholsterers	13
Shoemakers, etc.	7
Printers, bookbinders, etc.	17
Glassworks	4
Scavengers engaged in sewers, etc.	5
Ragsorters	4
Grocers	7
Butchers	4
Bartenders, waiters, etc.	16
Music-hall singers	3
Tobacco workers	4
Hatters	3
Painters, paperhangers, etc.	11
Plumbers	6
Claypipe makers	2
Furriers	4
Stonemasons	8
Railway Employés	10
Various	99
	568

These must be taken along with the cases given under A, when the superiority of the method of direct investigation over that of statistics is at once apparent. It is manifest, indeed, that it must be so, as long as only a minor part of the cases are notified. Moreover the place of work has not in all these cases been obtained, so that gaps occur in the facts.

The first heading under which multiple cases occur in such a manner as to suggest the influence of the works is :

Ironworks.

Workshop 1	8 cases.
Workshop 2	4 cases.

The next is velvet cutters, one workshop having 2 cases. This is the same firm as appears under dyeworks with 7 out of 11 ascertained dyers and bleachers. There can be no doubt about this case.

It is remarkable, after the indictment brought against warehouses by the particulars given under A, that under B very little appears. There are only two instances recorded of multiple cases notified, viz. :

Workshop 1	3 cases.
Workshop 2	4 cases.

Amongst tailoring establishments there is only one firm with more than one case, the number being 3.

In the case of rubber works one firm has 4 cases, a second 4, and a third 3. In the first instance there is strong presumption of infection.

Amongst printers and bookbinders one firm stands out conspicuous with 5 out of 17 cases, nor can this be assigned to exceptional number of workpeople.

It is interesting to note that 2 out of 5 scavengers, etc., are engaged at a manure works, which, as far as it goes, suggests infection at the works.

Two of the 4 tobacco workers are engaged at one firm, and it is only surprising that more persons engaged in this business do not appear on the list.

The painters, paperhangers, etc., are mostly without a precise place of business, so that comparison with the remarks under A is impossible.

Of the railway employés 5 out of 11 belong to the railway, but there is independent reason to believe that the cleaning and upholstering of railway carriages is a risky business with the present arrangements for cleanliness.

Amongst the various employments the most noticeable is that of porter and labourer in the Shudehill Market. Of these persons there are 7. There is no doubt that much spitting goes on in the market, and that the residual cabbages, etc., on which cows are fed are a risky food for dairy cattle.

This review, then, though it does not furnish the evidence which direct inquiry into histories of infection affords, gives fresh suggestions, and opens up new lines of investigation and administration.

APPENDIX III.

JAPANESE SERVIETTES RENDERED IMPERMEABLE, TO SERVE AS POCKET HANDKERCHIEFS FOR CONSUMPTIVE PERSONS, by G. H. LOCK, Chief Clerk in the Tuberculosis Department, Public Health Office, Manchester.

Dissolve with gentle heat 2 oz. cera alba Japonica, 1 oz. paraffin (or spermaceti) wax in about 10 oz. turpentine. Spread a thickness of about a dozen serviettes on a non-absorbent surface and brush over with the warm solution until well saturated. Separate, and hang to dry for a few days.

A better, but more expensive, solution is prepared as above, with the addition of a small quantity of pure rubber thoroughly dissolved in turps. The quantities of the ingredients may be varied with advantage with regard to the special texture of the serviettes to be treated. The more open the texture the larger will be the amount of Japanese wax required.

SPUTUM BOTTLES at about 6d. each wholesale.

These bottles may be obtained in quantity from Gebrueder Noelle, Ludenscheid, Germany, and from Curt Hoffman-Pinther, St. Andreasberg, un Harz, Germany. Being made of glass, the bottles should be occasionally boiled in order to secure their thorough disinfection.

DIVISION I.

PART II.

PREVENTION OF TUBERCULOSIS DURING CHILDHOOD.

"State and Individual Prophylaxis during Childhood, and the Need of Children's Sanatoria." By S. A. Knopf, M.D., *New York.*

MR. PRESIDENT, MEMBERS OF THE BRITISH CONGRESS ON TUBERCULOSIS, LADIES AND GENTLEMEN,—Although the preliminary official programme of this Congress only provided for a discussion of the prevention of tuberculosis in adults, I believe there is no need for me to apologise for having selected for my theme the prophylaxis of tuberculosis during childhood and the need of children's sanatoria. I desire to express to the Honorary Secretary of Section I., Dr. Bulstrode, my appreciation at his having arranged a division for this important subject.

The child of to-day is the man of to-morrow, and in our eagerness to stamp out tuberculosis among adults we must not forget that to prevent a child in tuberculous environments, or with an hereditary tendency, from developing the disease, means the saving of a life and the preservation of a perhaps very useful future citizen. Equally gratifying and important should it be to us to treat and cure as many tuberculous and scrofulous children as possible by timely and judicious intervention.

Before entering into the details of the means at our disposal to prevent the propagation of tuberculosis in childhood, we will discuss for a few moments our present knowledge of a direct hereditary tuberculous disease.

Bacillary transmission, coming directly from the paternal side through sperm, has been experimentally demonstrated. Clinically, however, the cases are exceedingly rare. According to Lartigan* there are only four reported cases, and even in these it was possible that there was hereditary predisposition with subsequent bacterial infection. Benda thinks spermatozoa incapable of transporting fertile bacilli. Walter† examined microscopically 230 different preparations from testicles and 63 from the prostate glands coming from 21 patients who had died of pulmonary tuberculosis, and could not find a single bacillus in any one of them.

The extreme rarity of primary genital tuberculosis in vagina or uterus seems the best clinical evidence that direct paternal bacillary transmission of tuberculosis practically does not exist.

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* "Congenital Tuberculosis." *Twentieth Century Practice*, vol. xx.

† Cornet: "Die Tuberkulose." Berlin, 1899.

Maternal bacillary transmission, on the other hand, can take place through the ovum or by way of the placenta. Forty such cases of indisputable congenital tuberculosis traceable to maternal origin are now on record. This number, however, is infinitesimally small compared with the number of authentic cases where fœtus or child of a tuberculous mother has been carefully examined without finding the slightest trace of tuberculous disease, either clinically, bacteriologically, or pathologically.

Straus,* who has made extensive experiments in this direction, repeatedly transplanted portions of the various organs of a fœtus from a mother in the last stages of consumption into guinea-pigs, and never succeeded in producing tuberculosis in these animals. Von Leyden† failed likewise in his experiments to inoculate tuberculosis by means of organs taken from a child which had died a few minutes after birth, and which had a consumptive mother. Nocard,‡ who only experimented with animals, took the organs of 32 fœti from four tuberculous rabbits and eight tuberculous guinea-pigs, and inoculated 32 guinea-pigs, all with negative results.

Thus it seems to us that we might consider direct bacillary transmission, even from the maternal side, so exceedingly rare as to leave it out of consideration in studying how to prevent tuberculosis in childhood. Let us rather assume two cardinal points; first, that tuberculous infection, contracted in whatever way during infancy or childhood, comes from without and not from within. Secondly, that there may, however, exist an hereditary predisposition to tuberculosis. How this predisposition is brought about I would not wish to attempt positively to explain. It is, however, I believe, reasonable to suppose that the toxins secreted by the bacilli in the lungs of a tuberculous mother, and the general debility caused by them, impair often quite seriously the development of the child *in utero*.

As to the frequency of tuberculosis in childhood I will not burden this address with many statistics. Permit me only to quote a few of the more interesting ones. Bollinger§ in 500 autopsies of children of all ages up to the fifteenth year found lesions of tuberculosis in 218 cases. In 150 of these the lesions were active and in 68 latent.

As to the time when children manifest the symptoms of tuberculosis most frequently, Heubner's‖ statistics are instructive. Of 884 infants, of which none suffered from tuberculosis at the time of their reception in the hospital, the development of the disease took place in—

3·6 per cent.	at the age of	3 to 6	months
11·6 per cent.	„	„ 9	„
26·6 per cent.	„	„ 1	year

* Straus: "La tuberculose et son bacille."

† *Zeitschrift f. klin. Medicin*, Bd. viii., 1884.

‡ *Annales de méd. exp.*, vol. i., 1889.

§ D'Espine: *Annales de méd. et de chir. infantiles.* Sept. 1, 1900.

‖ "Zur Verhütung der Tuberkulose im Kindesalter." *Congress of Tuberculosis*, Berlin, 1899.

Of 458	children	14·2 per cent.	were found	tuberculous	at the age of	2	years
„ 576	„	13·4 per cent.	„	„	„	3	„
„ 306	„	11·1 per cent.	„	„	„	4	„
„ 470	„	7·4 per cent.	„	„	„	5–6	„
„ 682	„	5·5 per cent.	„	„	„	7–10	„

Let us, however, incidentally remark that even these statistics seem to prove that children are very rarely born tuberculous. We know from animal experiments that the grosser pathological changes brought about by the bacillus of tuberculosis, such as enlargement of the glands, are not produced before two or three months after the penetration of this micro-organism into the system.

According to Kuss* the maximum death-rate from tuberculous lesions in childhood is reached between the second and fourth years. As to the *modus operandi* of the infection of children, we have, of course, no statistics. To ascribe the very frequent intestinal tuberculosis found in childhood exclusively to a tuberculous milk supply would be unscientific. There is no doubt that many a child has been rendered tuberculous because of taking tuberculous food coming from diseased cows, but in as many, perhaps even in more cases, intestinal tuberculosis is secondary, and has resulted from the ingestion of pulmonary secretions, since small children never expectorate. Autopsies seem to show that a very large percentage of children have contracted tuberculosis by inhalation, since the bronchial glands harbour the oldest foci, and seem thus to represent the point of entry of the bacilli. The presence of bronchial and pulmonary foci and tuberculous mesentary glands, when all lesions seem to be of the same duration, may well be explained by a double infection of the respiratory and alimentary tract of the child.

Latham† explains the frequent presence of tuberculosis in the bronchial glands as being probably due to the ingestion of tuberculous milk. According to this author, the bacilli pass from the intestinal mucous membrane, by way of the lymphatics, to the bronchial glands. From these glands the process spreads to the lung tissue: (1) by direct continuity; (2) by means of the lymphatics, but against the supposed lymphatic stream; (3) by ulcerating into a blood-vessel, and in this way disseminating the bacilli all over the body; and (4) by ulcerating into a bronchus. The right set of glands is more commonly affected than the left. Latham, whose observations cover more than 3,000 cases, admits, however, the very frequently infected air supply as a cause of tuberculosis in childhood. Thus we see that in young, as well as old, tuberculous infection can take place in three ways—namely, inhalation, ingestion, and inoculation.

Wherever there is a consumptive ignorant or careless with his expectoration there is danger to the life of a child, and it is not at all necessary that the child should come in close contact with this individual. Cases have been

* Kuss: "De l'hérédité parasitaire de la tuberculose humaine." Paris, 1898.

† Latham: "Pulmonary Tuberculosis in Early Childhood." *Lancet*, December 22, 1900.

reported where children given into a family to board became tuberculous owing to the presence of a consumptive in that family. Excluding the infection from pulverised tuberculous sputum, or from tuberculous saliva during the act of kissing, it is not unlikely that drop infection was in such cases sufficient to render the susceptible organism of a child tuberculous. Thus it would seem best that in all cases the consumptive should be kept away as much as possible from the child, and the greatest care should be exercised in selecting a home or attendant.

The infection of an infant from tuberculous sputum can happen in various ways. At the moment of the child's birth, if it should happen to be asphyxiated, the physician or midwife may apply his or her mouth to that of the infant and inflate its chest to bring the respiratory organs into play. If the operator is consumptive, the danger of imparting the disease is evident. In my recent book on tuberculosis* I quoted the remarkable case of Reich, which, I believe, will bear repeating here as an illustration. A midwife in the village of Neuenberg became consumptive in 1874, and died of this disease in July, 1876. Ten children, without hereditary predisposition, attended by this midwife between April, 1875, and May, 1876, died before reaching the age of seventeen months. This consumptive midwife was in the habit of sucking the mucus from the mouths of new-born children and blowing air into their mouths when there was the slightest sign of asphyxia. To avoid such accidents the mouth-to-mouth respiration should be replaced by the safer method of using the catheter, as recommended by Tarnier and Lusk. Laborde's method of rhythmical traction of the tongue will also suffice to cause the child to breathe if the obstructing mucus has been removed. A simple swab suffices to remove this mucus, and to do this by mouth-to-mouth suction is to be condemned.

Tuberculous mothers and fathers are, as a rule, taught not to kiss their children on the mouth; but this injunction is not always obeyed, because it had not been accompanied by an explanation that not only the secretions from the lungs but also the saliva may be bacilliferous. Tuberculous mothers will sometimes refrain from kissing their children, but, owing to insufficient knowledge, they will often feed the children with spoons which they have just put in their own mouths to taste the food. Again, the tuberculous mother, since she is forbidden to give the child the breast, may frequently taste the milk through the child's rubber nipple, and, without cleaning it, insert it into the baby's mouth.

Inoculation during infancy has been observed in Jewish children as a result of ritual circumcision by a tuberculous operator. I have been able to collect about twenty authentic cases; but the surgical literature of all countries where Israelites practise this rite according to the orthodox way continue to contain reports now and then of cases of tuberculous infection through this mode of circumcision. The tuberculous inoculation following

* Knopf: "Pulmonary Tuberculosis: Its Modern Prophylaxis and the Treatment in Special Institutions and At Home." P. Blakiston's Son & Co., Philadelphia.

this operation manifests itself first as a local disease of the genital organs, from whence it becomes generalised in a great number of cases. The operation of circumcision, when skilfully and carefully performed, is in itself trifling, but the sucking of the prepuce afterwards makes it dangerous, for it is evident that if the operating rabbi should be a consumptive inoculation is made very probable. Cases of syphilis and diphtheria have also thus been transmitted. It has even happened that, owing to the lack of skill and care on the part of the operator, secondary hæmorrhage, erysipelas, or gangrene has ensued. A most reliable prophylactic measure against the possibility of inoculating the child when the parents insist upon the orthodox rite of circumcision is the suction of the blood by the aid of a glass tube, as practised in France and Germany. However, no matter what method may be employed for this part of the operation, only a man free from communicable diseases and skilful in the art of surgery should be permitted to perform circumcision.

So much for the dangers to which the infant is exposed. When the child becomes old enough to creep about and play on the floor it is exposed to all three methods of infection at once. If there is a consumptive in the family, and he is careless, ignorant, or helpless, there will be ample opportunity for the little one playing on the floor to inhale the dust, laden with bacilli, coming from the dried and pulverised expectoration. Like all children, it will touch everything on or near the floor, and then put its fingers in its mouth. To conceive of a more certain method of ingesting tuberculosis is hardly possible. If the child's nails are not clean and closely cut it will inoculate itself with tuberculous substances. This method of infection happens quite often, particularly when the child is suffering from eczematous or other skin troubles. The result may be a local tuberculosis, or, perhaps more frequently, a lymphatic infection. To relieve the itching sensations produced by the irritating nasal secretions of a coryza, the child will poke its fingers into its nose, and we may have here the starting-point of a facial lupus.

To prevent such inoculation the mothers and nurses should see that the children's fingers are kept as clean as possible and their nails cut. As long as the child is too small to clean its nose, regular nasal toilets with some mild borated solution or warm previously boiled water should be instituted. Eczemas and other skin eruptions should receive immediate medical attention, for, as has been said, left to themselves they may give entrance to tuberculous infection.

To assure a rigorous prophylaxis against tuberculosis from the very earliest day of childhood, I do not know of any better plan than to have printed directions issued by the boards of health, which should be placed in the hands of every physician and midwife to give to the future mother, to the nurse, or the immediate members of the family. The instruction leaflets should contain everything relating to prophylaxis, general cleanliness, ventilation, nutrition, etc., and should be printed in plain, comprehensible language.

While separating a child from the tuberculous mother and giving it the best hygienic and sanitary environments elsewhere would be the ideal way of solving the problem, it is but rarely practicable. We must find means to

protect a child in its own home. To avoid the inhalation of tuberculosis the greatest care should be exercised on the part of parents, relatives, or friends with whom the child lives. The well-known precautions concerning the tuberculous expectoration, and also drop infection, should be rigorously adhered to by everyone who may come in contact with a child. The child should not sleep with a tuberculous mother. It should have its own little bed from the day of its birth. The child should never be taken on visits to consumptive friends or relatives. Day nurseries or infants' shelters where working women leave their children should be subject to thorough sanitary supervision, and no tuberculous individual should be engaged as employee in such an establishment.

To combat the danger from ingestion of tuberculous milk is, of course, primarily a duty which devolves upon sanitary authorities, the State, county, or city boards of health respectively. It is the duty of these authorities to make the sale of tuberculous milk practically impossible; but to all mothers who do not nurse their children, to boil or sterilise the child's milk should become a religious duty, particularly in cities where one is never certain of the absolute purity of the milk. Whenever it is possible, cow's milk should be replaced by goat's milk, which, as is well known, is never tuberculous. When the child grows older and eats meat, all that is of doubtful origin should, of course, be thoroughly cooked.

To kiss the child on the mouth should not be allowed in any case, and as the child grows older it should be taught not to kiss strangers at all, and relatives and friends only on the cheek. Caressing and kissing domestic pets, such as parrots, canary birds, dogs, cats, etc., should be discouraged.

The remnants of food left by a tuberculous invalid should not be eaten by anyone, but more particularly not by a child, neither should the latter eat any food handled by a consumptive.

The floor of the rooms where the child lives and on which it may play should not be carpeted. It should be kept scrupulously clean, and, if desirable, a clean mat may replace the carpet. To keep the ordinary wooden floor clean and as far as possible aseptic the use of petroleum wax, as recommended by E. Petit,* should be endorsed. Experiments have demonstrated that the various pathogenic microbes, such as the bacillus of diphtheria, of typhoid fever, the streptococci and staphylococci, and the bacterium coli, cannot live in this substance, and the tubercle bacillus loses its virulence when in contact with it. The cracks in the floor should be filled and also covered with this substance. Water and even antiseptic substances do not alter this wax. Dry sweeping should not be permitted in children's rooms. If wiping the floor is not practicable, it should be swept with moistened sawdust. All these precautions recommended for the children's rooms in the private home should, of course, be practised, if possible, even with more rigour in public nurseries, kindergartens, asylums, orphanages, etc.

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* "Recherches sur un procédé simple pour asepti er les planchers." *Congrès de la Tuberculose*, 1898.

Expectorating on or near public or private playgrounds should be considered a misdemeanour and punished accordingly. These grounds should be kept specially clean and from time to time be strewn with clean gravel.

The greatly-loved visits of little ones to menageries must be of concern to the sanitarian who desires to protect the children from tuberculosis. To visit the ape-house in the Zoological Gardens and to remain there as long as possible is the delight of children, and yet, perhaps, next to cattle there are no animals so subject to tuberculosis as apes. Add to this the commotion, dust, and impure air in the average ape-house at the usual time of the children's visits, and one cannot help thinking of an absolute danger. The managers of menageries and zoological gardens should do their very best to reduce this source of infection to the least possible minimum. A tuberculous keeper might very easily infect the animals under his care, especially since their confinement makes them particularly susceptible to the invasion of the bacilli. The law which authorises the killing of tuberculous cattle should be extended to all other animals as well. There seems no reason why an ape-house containing numerous consumptive animals should not be as much a source of infection as a tenement house where ignorant and careless tuberculous individuals have expectorated indiscriminately. Expectorating on the floor or anywhere else in these menageries should be strictly prohibited, to keepers as well as to visitors, and the floor should always be strewn with moistened sawdust during visiting hours.

The same hygiene which should prevail in the kindergarten and playroom should, of course, also be universal in the school-house. School-children should be taught the use of spittoons and handkerchiefs. Expectorating anywhere except in a proper receptacle should be punished in the same way as any violation of class rules. The elevated non-breakable spittoon (Figs. 1, 1A) should be given the preference to the ordinary porcelain or glass cuspidor placed on the floor. I have often wondered if the individual pocket-flask (Figs. 2, 3, 4, 5) in the public school would not also tend to decrease epidemics of whooping-coughs, measles, and grip, besides being one of the best means of preventing the contraction of tuberculosis through indiscriminate expectoration. Each child should have a cupboard where he should keep his own towel and drinking-cup.

To avoid drop infection, that is to say, the ejection of small particles of bacilliferous saliva during the so-called dry cough or sneezing, children should be taught to always hold a handkerchief before their mouth while coughing or sneezing.

Obligatory periodical disinfection of the schoolroom by formaldehyde gas may also be advantageously instituted. To make the disinfecting and cleansing of the classroom as thorough as possible I would suggest that desks and chairs be so constructed that they can easily be folded together after school hours. As another sanitary measure I would insist that lady school-teachers and the grown-up girl pupils should not, under penalty of discharge, be allowed to wear trailing dresses. The short rainy-day skirt is certainly far more sanitary than the trailing skirt, which so often is made to do the scavenger's dirty work.

While children suffering simply from scrofulous manifestations might be permitted in public schools, all pupils suffering from pulmonary tuberculosis, or teachers afflicted with the same disease, should not be allowed there.

The early recognition of pulmonary tuberculosis, which is so essential in the solution of the tuberculosis problem in the adult, is equally important in regard to the combat of this disease in childhood. Here comes in a function of the school physician (and no school should be without one) which I believe has not yet been sufficiently appreciated nor exercised. The chest of every

FIG. 1.—DR. KNOPF'S ELEVATED SPITTOON OF METAL (CLOSED).

FIG. 1A.—DR. KNOPF'S ELEVATED SPITTOON OF METAL (IN USE).

child attending the public school, and every teacher teaching there, should be carefully examined at least twice or three times a year, if owing to a large number of pupils it cannot be done every three months. Through the early discovery of tuberculosis in a pupil, an immediate warning to the parents, and timely and judicious treatment, many a young life will be saved.

We come now to the portion of our discourse which treats of the hereditary disposition which the child of tuberculous parentage possesses at birth. We may define this hereditary disposition in two ways. As bacteriologists we would probably say a hereditary predisposition is that peculiar condition

whereby the various organs, and in particular the respiratory, and next to it the intestinal tract, offer a very favourable soil or culture medium for the development and multiplication of the bacilli. As clinicians we might say hereditary predisposition of tuberculosis means a physiological poverty, brought

FIG. 2.—DEITWEILER'S POCKET FLASK.

FIG. 3.—LIEBE'S BLUE GLASS SPUTUM FLASK.

FIG. 4.—KNOPF'S ALUMINIUM FLASK WITH PLAIN COVER.

FIG. 5.—KNOPF'S ALUMINIUM POCKET FLASK (CLOSED).

FIG. 5A.—FUNNEL AND OPEN COVER TO FIG. 4.

as an inheritance into this world, whereby the system is minus phagocitic and bactericidal powers inherent in strong and healthy organisms.

It is well known that the transmission of a tuberculous tendency comes most frequently from the maternal side. The most radical means of preventing a progenity subject to tuberculosis would, of course, be the interdiction of

marriage to all tuberculous individuals. Our present state of society and our conception of individual liberty will scarcely make it possible, for the time being, to inaugurate legislative means to counteract marriages between tuberculous individuals. General education and enlightenment on this question may be helpful as a prophylactic means; but the family physician will have to do the bulk of the work in preventing such dangerous unions. Even the cured consumptive should not think of marrying until a considerable time after his complete restoration to health. Gerhardt* counsels to wait at least one year, but I consider this hardly enough and would much rather make it two years.

To bring about abortion when a probably tuberculous conception has taken place I consider useless. Instead of saving one life there is the danger of sacrificing two; but in view of our present knowledge of tuberculosis I have no hesitation to declare that I do not consider it a sin either before God or man to teach a tuberculous mother or father how not to procreate a tuberculous issue. If, in spite of the warning of the family physician, a tuberculous mother has conceived, what are we do? Shall we leave the mother and child to their fate? Surely not! Though the mother may be suffering from tuberculosis and the child seemingly be doomed to become a candidate for consumption, modern phthisio-therapy has taught us not to despair, and we may save the lives of both; but we must begin by treating the child *in utero*, and with this, of course, begin a thorough treatment of the mother's condition.

A woman who is to give birth to a child should abandon the corset and tight clothing in time to allow a continued, free abdominal and thoracic respiration. Better yet is it if she has never been addicted to the habit of tight lacing, for the experiments of Kellogg† and Mays have demonstrated that the so-called female or costal type of respiration, which prevails among civilised women, is the result of their restricting and unhygienic mode of dress, and is not due to the influence of gestation, or to a natural difference in the anatomy and physiological growth of man and woman. If a support for an unusually large breast must be worn, let the corset be replaced by a comfortable waist which permits free and deep respiratory movements. In short, the whole dress of the mother should be so arranged that there are no restrictions, and no organ in the body should be hindered in its free physiological functions. For the future mother to live as much as possible in pure, fresh air, to take frequent breathing exercises, to avoid crowded assemblies where the air is vitiated, to live, in short, as hygienic a life as the family's social condition will permit, will have a most salutary effect on the child's future health. If the circumstances are such that you can induce this family with a tuberculous mother, living in the city, to move to the country or to a smaller town where modern hygienic conveniences can be had, but where

* "Ueber Eheschliessungen Tuberkuloser." *Zeitschrift f. Tuberkulose u. Heilstattenwesen.* Sept., 1900.

† Kellogg: "Experimental Researches Respecting the Relation of Dress to Pelvic Diseases in Women." *Transactions of the Michigan State Medical Society*, 1888.

the crowded and noisy conditions of city life are absent, so much the better for the prospects of mother and child.

The new-born child is in need of pure, fresh air as much as the mother, and the lying-in room and the nursery should always be well ventilated. When in due time the child is taken for an airing, the thick, almost impermeable veil should be abandoned. These veils, often tightened around the little face, press against the nose and make it difficult for the child to breathe naturally, yet the mother wonders how the baby got into the habit of breathing through the mouth.

Frequently also mouth-breathing in children, and sometimes in adults, must be attributed to adenoid vegetations in the retro-pharynx, or to enlarged tonsils. These as well as all other causes of obstruction to a free, natural respiration, such as deviated septum, enlarged turbinated bones, hypertrophied mucous membrane, polypi, etc., must be removed if we desire to protect the child or adult from chronic nasal, pharyngeal, or laryngeal catarrhs, so often the fore-runners of pulmonary disease. Only after the removal of all possible causes of obstruction in the upper air passages is a natural physiological respiratory function possible, and only under such conditions can we hope for real benefit from breathing exercises.

The proper bringing-up of children that have a tendency to become tuberculous is of the greatest importance. Many are poor eaters from the day of their birth. Discipline, not to allow too many sweets, to observe regular meal-times, and to keep the bowels in good condition, are the best means to combat a dislike for eating. As early as possible children should be taught to clean their teeth thoroughly after each meal, for a good digestion is dependent upon the condition of the teeth. The dislike to play outdoors, which is so characteristic of the little candidates for tuberculous diseases, can also only be overcome by discipline. To dress them too warmly and bundle them up all the time is as injurious as having them remain most of the time indoors. This hardening of the constitution will be the best method to counteract a disposition to take cold easily, which in children predisposed to tuberculosis has often a tendency to develop chronic catarrhs of the respiratory tract.

I consider the air-bath and sun-bath for children at the earliest age most beneficial. Let the little ones toddle around naked every day for a short time, in cold weather in well-warmed rooms, and in summer in a room bathed by the rays of the sun, but always on a clean floor or clean Japanese matting. With their growing intelligence children should be taught, by practice and example, the value and the love of pure fresh air. As soon as the age and intelligence of the child will permit, breathing exercises should be taught him. He should learn to like them as the average child does general gymnastics.

Public as well as private schools and colleges should be model houses in regard to cleanliness, hygiene and constant ventilation. Ventilation not only when the children have left, but all the time, and, as Emmert * says, since

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* Emmert: "Is our Public School System Conducive to Tuberculosis?" *Transactions of the Iowa State Medical Society*, 1898.

windows and doors alone do not suffice properly to ventilate rooms when occupied by a mass of human beings, mechanical devices should be resorted to to assure always a plentiful supply of fresh air.

Instruction in elementary hygiene should form a part of the curriculum of all schools; this course might be advantageously given by the school physician. Over-work during school life is often an indirect cause of furthering a tuberculous tendency in children, and indeed it is injurious even in a healthy child. It is in such cases where the school physician's intervention may indeed prove the saving of a child's life. The physician should work in common with the teachers for more outdoor instruction and more outdoor play, and whenever possible the school physician should even supervise the breathing exercises. Botanising tours and geological excursions should be frequent for all school children, and singing and recitation in the open air during the warmer season be made a part of the daily curriculum. Such measures must be preventive of disease, and particularly of tuberculosis. Lungs and vocal organs will develop, and the general health of the children improve; in short, let us exercise the same diligence for the development of a sound body in the child at school as we have been in the habit of exercising to develop his intellectual capacity. The love of outdoor sports, breathing exercises, and pure fresh air must be kept up throughout life by the young men and women of tuberculous tendency.

In choosing his future career the young man born with that peculiar susceptibility which Peter describes so aptly as "tuberculisable," should seek professions which will demand outdoor life. Farming, gardening, and forestry will assure him the longest and most useful existence.

Hydro-therapeutics as a measure to prevent pulmonary tuberculosis tends to develop to more rigorous action the vasomotor system; it also should be instituted at an early age. A child a few months old can support with impunity a rapid sponging off with cold water, after its warm bath, followed by a relatively vigorous friction with a soft Turkish towel. As the child grows older he should not only be taught this use of cold water after his semi-weekly or weekly warm bath, but he should wash at least the face, neck, and chest every morning with cold water. Better yet, if he can accustom himself early to a daily cold douche. The utility of all-the-year-around swimming baths, where old and young of all classes can, gratuitously or for a moderate price, enjoy the salutary effects on body and mind of a good swim, is too well known to need insisting upon.

There should be many small parks and playgrounds and public baths for old and young in the densely crowded districts of our large cities. City parks have justly been called the lungs of great centres of population. Here mothers and children of the poor can breathe purer and fresher air, which is one of the best means of preventing tuberculosis.

I have thus far but slightly touched upon the sociological side of prophylaxis of tuberculosis during childhood. I have made no distinction between scrofulous and tuberculous disease, for the former is but a lighter form of tuberculosis. The same sociological conditions which further tuberculosis in

the pulmonary form further also scrofulous diseases. Unsanitary, over-crowded tenements, houses built on damp soil, etc., are some of them. Children from syphilitic and alcoholic parents are particularly prone to tuberculous and scrofulous affections. In seeking to prevent tuberculous and scrofulous disease in childhood we must combat our two great social evils, syphilis and alcoholism, and improve the housing of the poor.

Here I cannot help denouncing also very strongly the employment of children under fourteen years of age for labour in various industries requiring often six to ten hours of continued manual labour, or in factories where work even taxes the healthy organs of a full-grown man. As to what best to do for the underfed pupils, the children of poor parents, so often irregular in attendance because of tuberculous or scrofulous diseases, I would suggest a philanthropic enterprise which would cost little and which would do a world of good. Provide them with a lunch of a few good meat sandwiches and one or two glasses of good milk, and I am convinced that fewer will develop tuberculosis and scrofulosis, and they will do better work at school and at home.

To avoid a pauperising tendency a few pennies may be charged for these lunches. This practice is in vogue in the city of Boston (Massachusetts), and works most satisfactorily. After a few weeks of such persistent administration of good lunches the formerly underfed children improve in appearance and often gain from two to three pounds in weight.

For children suffering from either tuberculous or scrofulous manifestations the medical treatment is well known. Cod-liver oil, arsenic, iron, but above all the hygienic and dietetic measures, aero- and solar-therapy, under constant medical supervision, in a good healthy locality, preferably in sanatoria erected for that purpose in the country or on the seashore, have proved to be the most efficacious means to treat these diseases during childhood.

The results obtained in Dutch, French, German, Italian, and Scandinavian seaside sanatoria for tuberculous and scrofulous children have been most gratifying. They vary from fifty to seventy-five per cent. of complete cures. Nearly all these institutions provide for the intellectual development of these children, which, of course, is equally essential.

The prophylaxis of tuberculosis during infancy and childhood should engage the attention of physician, sanitarian, statesman, and philanthropist alike. I repeat, let us, in our eagerness to combat consumption in the man and woman, not forget that the prophylaxis and treatment of tuberculous diseases in children constitute one of the most essential factors in the solution of the tuberculosis problem.

May every one of us, when returning to our respective fields of labour, exert his influence in inaugurating an intelligent and rigorous prophylaxis of tuberculosis during childhood, and advocate the establishment of special school sanatoria for the many little ones suffering from this disease.

"Prevention of Tuberculosis during Childhood." By Prince Auguste D'Arenberg.

Since one of the most effective means of combating tuberculosis is to prevent it from finding favourable ground wherein to strike root and develop, I will ask your permission to say a few words respecting an institution which has been endeavouring to rescue children from a condition of sickliness and from that weakness which is premonitory of the appearance of tubercle and its terrible consequences.

It is but a few years back—I believe it is so even to this day—that children's hospitals were unable to admit the whole of those who were in want of their care. Little ones, more particularly those in a condition of chronic illness, were neither admitted early enough nor allowed to stay long enough to ensure their being cured.

Moreover, the distances which separate the various districts of large towns from one another are often so great as to prevent their being traversed unless in case of some immediate urgency. It follows that at the inception of disease, or for the diagnosis of some undefined ailment, or in the ability to ensure proper care day by day, attendance at the hospital is a practical impossibility. What a host of cases is there not, of which the results would be innocuous if they were dealt with at once, and which, for want of being immediately attended to, assume the highest gravity? How often does it not occur that families cannot let their children undergo continuous treatment where this involves the repeated sacrifice of numerous hours of leisure? How much greater still the difficulty of obtaining proper advice when it has to be sought in distant parts of the town far from one's daily occupation!

It is the fact of these limitations, limitations entailing the loss of a large number of young lives, that gave rise to the idea that special dispensaries for the benefit of weak or sickening children should be established.

Thanks to these foundations, all the practical obstacles I have just pointed out have been done away with. In every district in Paris, and even within a shorter radius, special dispensaries for children have grown and multiplied. One need only glance at the statistics of their daily work to be convinced of their beneficent effects.

Consultations take place three, and sometimes four, times a week. The greatest care is taken that children suffering from infectious diseases shall be kept apart and separately examined. Each day the child-patient calls, on his way to or from school, in order that the treatment prescribed by the medical attendant may be duly carried out. Annexed to the dispensaries are suitable baths and douche appliances. After each douche or bath a re-invigorating meal is given to the child.

Truly marvellous results have been achieved under this system. I cannot deal before you with every dispensary in Paris and throughout France, but I may perhaps quote a few figures which will suffice to give you an idea of the happy influence these special dispensaries for children have exercised.

The first dispensaries founded in Paris owed their creation to the

Philanthropic Society, and all those established since are repetitions of these first model ones. During the year 1900–1901, more than 30,000 consultations were given in three of the dispensaries, over 17,000 children have undergone daily treatment, and above 55,000 baths and douches have been administered. In the same three dispensaries, during the last ten years, nearly 400,000 children have been under care.

An examination of the tables drawn up, year by year, by the doctors shows that the diseases from which the children of the poor suffer mostly have their origin in scrofulus tendencies or rachitis, and that the forms they assume are chiefly those of affections of the eyes and the skin, or again, chronic bronchitis. Every one of these ailments, provided they are taken in hand at an early stage, may end in an improvement of the general condition of health, or in complete cure. If I do not give you figures, it is because such statistics require very close going into; but there is a point on which I want to lay stress, because it appears to me to be more intimately related to the course of studies and inquiries this Congress has in view. The labour of our medical staff, that of our matrons, does not limit itself to consultations and curative treatment. Their endeavours are ceaseless in order to spread among the working classes vital notions of infantile hygiene, well knowing that ignorance and thoughtless want of care are even more powerful agents than wretched poverty in causing death and perpetuating morbidity among children. In this wise, our medical men recommend mothers to suckle their own children, and set their faces against vitiated artificial feeding, besides giving mothers the necessary advice to enable them to arrest disease by preventing its development. We may perhaps be deceiving ourselves; nevertheless, we have some cause to believe that, in some districts at any rate, we have achieved success, and that certain deplorable habits and practices have ceased to exist.

Let me add that wherever just and practical ideas make headway, the institutions they give rise to are sure to find imitation. Thus it is that, in addition to the dispensaries of the Philanthropic Society, forty-two similar dispensaries have been established in Paris, either by the Poor Law authorities or by private charity; and, although I have not exact figures by me, I believe I am within the truth in saying that several hundred thousand children in each year attend these dispensaries and benefit by the medical care and the treatment which their condition requires.

And if it be true that treatment at an early stage, and better habits as regards hygiene, render a child stronger and bestow upon him greater power of resisting disease, then indeed children's dispensaries may fairly be considered as powerful auxiliaries in the struggle against tuberculosis.

"Colonies Scolaires." Par Raoul Bompard.

Il est inutile de rappeler dans quelles conditions déplorables, aussi bien pour l'hygiène que pour la moralité, sont logés dans les grandes villes la plupart des enfants pauvres.

L'hiver se passe sans presque que le logement ait été aéré.

Puis vient l'été. L'école se ferme. Que va devenir l'enfant?

Ira-t-il flâner dans des squares, dans des jardins situés entre des murs où sa santé ne profitera guère, et où il est exposé aux plus fâcheuses rencontres?

De là est venue l'idée d'envoyer les enfants pauvres en vacances au moyen de subventions publiques.

La forme que cette idée a d'abord revêtue en France n'est pas de nature à intéresser spécialement ce Congrès.

Il s'agissait, en effet, au début de véritables voyages scolaires. On appelait à en profiter les enfants les plus méritants et le voyage était ainsi une récompense pour le travail et la conduite. Le but du voyage était fixé d'après l'intérêt que le séjour dans une localité ou la visite d'une industrie, par exemple, présentaient pour l'instruction de l'enfant.

Mais cette conception s'est modifiée, ou plutôt elle en a engendré une autre, et, à côté du voyage de vacances, la colonie scolaire a pris sa place et, comme vous le verrez, une large place.

La colonie de vacances s'adresse non aux plus laborieux, mais aux plus chétifs. Elle dirige ses efforts vers ces jeunes anémiques, aux épaules rentrées et aux joues pâles, qui sont bien des candidats à la tuberculose. Elle les envoie soit à montagne, soit à la mer, d'après les indications médicales, car c'est le médecin qui est le juge sans appel pour choisir les colons et les colonies.

Et d'abord un premier bienfait est immédiatement réalisé. Pendant la durée de son envoi en colonie, l'enfant est astreint à des soins hygiéniques, à des ablutions fréquentes, qui lui donnent des habitudes de propreté.

Malheureusement le séjour que les fonds publics ou les libéralités privées peuvent ainsi assurer aux jeunes écoliers est bien court. Il n'excède pas en général une durée de 20 à 30 jours. Mais ce serait une erreur de croire qu'il n'en rende pas pour les enfants une amélioration certaine.

Sur ce point tous les témoignages sont concordants et précis.

Le fondateur de ces œuvres en France, M. Cottinet, a dit avec raison qu'on obtient des réactions vitales prodigieusement supérieures à celles que retirent de vacances doubles en durée les favoris de la fortune. On peut les évaluer, dit-il, en moyenne faible, à 3 fois l'augmentation physiologique ordinaire de la taille, 5 fois celle du poids, 9 fois celle du développement thoracique.

L'œuvre des colonies de vacances fondée en 1882 par Madame de Pressensé et qui en 1896 a envoyé 1,106 bénéficiaires, constate pour 1898 une augmentation de poids de 1·440 gr. pour les garçons, 2·30 gr. pour les filles.

A Bordeaux M. Callisson, sécrétaire général des colonies scolaires, constate une augmentation moyenne de 2 kgr. allant chez quelques-uns jusqu'à 5·500 gr.

A St. Étienne l'œuvre privée des Enfants à la Montagne constate en 1897 que 2 enfants seulement ont perdu 500 grammes. Les autres gagnent de 1 à 3 kgr., quelques-uns 4, 5, 6 kgr. (ceux-ci étant restés 2 mois) et le même compte-rendu pour l'année 1897 exprime les progrès accomplis d'une manière saisissante en disant que l'œuvre a produit 1,200 kgr. de chair, d'os, de muscles, et de sang.

Aussi le mouvement en faveur de ces colonies a-t-il obtenu en France un vif succès.

Il a été importé chez nous en 1883 par M. Cottinet, et adopté en 1887 par le Conseil Municipal de la Ville de Paris.

Cette ville a envoyé à la campagne—

En 1889 900 élèves moyennant 85,000 francs.
„ 1896 4,130 id.
„ 1897 4,254 id.
„ 1898 4,277 id.

moyennant 275,000 francs, dont 200,000 fournis par les fonds municipaux et 75,000 par l'œuvre semi-officielle des Caisses des Écoles et les souscriptions privées.

Cette institution n'est applicable qu'à la population scolaire de 7 à 13 ans.

Pour les plus petits, d'autres œuvres libres se sont fondées, notamment :—

L'œuvre parisienne des colonies maternelles scolaires, présidée par M. Faillot, maire du IVe arrondissement, qui a une maison à Mandres ;

L'association des Instituteurs pour l'Éducation et le Patronage de la Jeunesse, qui veulent pouvoir, moyennant un sacrifice d'argent, assurer à leurs enfants des vacances dont ils ne sauraient eux-mêmes profiter. En 1898 cette société s'est chargée d'envoyer en vacances et de surveiller 300 enfants des gardiens de la paix ;

L'œuvre des trois semaines, fondée en 1888 à Batignolles, qui a près de 1,500 bénéficiaires aujourd'hui alors qu'elle en avait 3 au début. Elle possède 3 immeubles à elle, dont un à la mer. Elle y envoie aussi des familles des mères dont les enfants sont trop petits. Il y a eu ainsi 102 familles transportées au bon air en 1899.

Depuis 1887 beaucoup de villes ont suivi l'exemple de Paris, notamment Bayonne, Bordeaux, Lyon, Marseille, Roubaix, Lille, St Etienne, Agen, Toulouse.

On cherche maintenant à assurer un temps plus long et une cure plus efficace aux petits anémiés.

Le projet *d'écoles de santé* a été agité.

Un arrondissement de Paris, le VIIe, a créé une *Villa Scolaire* à St Germain en Laye sur la lisière de la forêt. Ce sanatorium scolaire fut inauguré le 25 juillet 1897. Grâce à la bonne direction donnée par M. Risler, maire du VIIe, chaque lit n'est revenu qu'à 27 fr. 50, tout compris. Il y en a 20. Au printemps et à l'automne elle reçoit les convalescents des dispensaires municipaux—pendant l'été les colonies scolaires.

Tous les arrondissements parisiens rivalisent d'ailleurs de zèle. Le XVIIe qui a une population de 200,000 habitants environ, et où les colonies ont été particulièrement bien organisées par M. Malétras, envoie aujourd'hui 400 élèves en vacances, alors qu'il n'y en avait que 100 en 1888.

Comme on le voit, le succès de l'idée a suscité des applications différentes et l'on peut grouper les Sociétés de Colonies Scolaires en 3 classes :—

1°. Celles qui envoient leurs pupilles dans des maisons, des institutions libres en général, qu'ils occupent sous la surveillance de leurs maîtres.

2°. Celles qui les disséminent chez des paysans moyennant une redevance généralement très faible. Cette méthode se recommande par son bon marché, mais elle augmente la responsabilité des directeurs puisque la surveillance est évidemment plus difficile.

3°. Celles qui ont une ou plusieurs maisons à elles, leur appartenant, et où elles envoient, non plus pendant 2 mois, mais pendant toute l'année les enfants les plus chétifs, notamment les convalescents.

Samedi dernier encore le XIe arrondissement de Paris, l'un des plus peuplés et des plus pauvres, inaugurait une colonie permanente de ce genre installée dans un ancien château des Vosges. C'est un millier d'enfants que la Caisse des Écoles du XIe arrondissement envoie chaque année dans ces montagnes. Ils y trouvent un parc, un petit sanatorium, les bâtiments scolaires, etc.

De tels efforts constituent peut-être la meilleure methode de prophylaxie infantile contre la tuberculose, en rendant l'enfant plus vigoureux et moins attaquable par le bacille.

C'est pourquoi il ne nous a pas paru indigne des travaux du Congrès que mention en fut faite à cette place.

"L'Éducation Moderne de la Jeunesse envisagée comme Cause Prédisposante à la Tuberculose." Par M. le Docteur Baradat, *de Cannes.*

En Europe, la tuberculose inscrit à son compte le quart de la mortalité totale. Mais, tandis qu'en Angleterre elle a diminué juste de moitié depuis 40 ans, en France elle est en progression et fait annuellement cent cinquante mille victimes. Cette différence tient, comme l'indique le Professeur Brouardel, à ce que depuis 1851, les prescriptions d'hygiène, qui sont, sinon encore discutées, du moins à peine appliquées sur le Continent, ont reçu en Angleterre une application méthodique.

En France, on a incriminé la caserne, et une circulaire récente, émanant de la Commission d'Hygiène de la Chambre, demande aux médecins militaires, de fournir un rapport sur les causes de la tuberculose et les moyens les plus sûrs de la dépister; c'est en effet dans l'armée, dit-elle, que les cas sont le plus fréquents. En réalité c'est encore là, à notre avis, une de ces assertions théoriques qui vont contre les faits, et le plus grand nombre des médecins de l'armée pensent que le service militaire ne crée pas la tuberculose mais fait évoluer les états latents. Ce fait paraît démontré, puisque la plupart des tuberculoses qui éclatent dans l'armée, se manifestent dès la première année de service, ce qui indique bien que le germe existait déjà et qu'une occasion a suffi pour le faire éclore.

"La tuberculose est introduite dans nos casernes à l'état d'affection latente, comme le dit Kelsch. La vigueur de la constitution et les attributs d'une santé robuste n'excluent point l'existence de ces lésions cachées qui se démasqueront un jour ou l'autre, à l'occasion d'une perturbation quelconque de la santé générale, engendrant par infection secondaire, la pleurésie, la bronchite à répétition, la phtisie ou enfin la granulie généralisée."

Si donc la progression est constante alors que l'hygiène est meilleure et que les conseils de révision éliminent mieux les suspects, il semble bien qu'il faille chercher l'origine de la tuberculose dans la période de la vie qui précède l'entrée dans l'armée.

Nous en trouverons d'abord les causes dans les conditions générales de la famille et dans la forme même de l'éducation familiale. Darenberg écrit avec raison: "La race actuelle est préparée à être cueillie par la tuberculose parce qu'on élève dans du coton une foule d'enfants délicats qui n'auraient pas dû vivre si on ne les avait pas défendus artificiellement contre la mort. Mais la phtisie les guette, puis les étreint quand ils deviennent adultes et négligent ces précautions familiales qui leur avaient permis de résister à l'envahissement des germes tuberculeux sommeillant dans leur corps. Pendant qu'on choie ces êtres malingres, on n'en a pas d'autres, parce que l'élevage des enfants délicats coûte trop cher pour qu'on puisse s'offrir le luxe d'en avoir plus d'un ou deux. Autrefois on en avait huit ou dix, il en mourait bien quelques uns en bas âge, mais les autres, assez résistants pour survivre, devenaient des êtres bien portants."

Mais nous laisserons de côté ce point qui touche à un problème de la vie nationale, la dépopulation, pour nous attacher spécialement à l'influence de l'école.

On sait que le régime actuel de la plupart des écoles est l'internat. Nous devons ce système aux Jésuites, nous apprend le père Didon: ceux-ci, désireux de remédier à l'indiscipline qui, vers le XVIème siècle, avait amené la décadence des Universités, s'étaient appliqués à tout enrégimenter, à tout cloître, sans se demander s'ils ne pervertissaient pas ainsi la jeunesse.

Or, tous les groupes humains renferment, en plus ou moins grand nombre, des individus porteurs de tubercules latents, bien qu'ils présentent, par suite de la résistance que leur donne le jeune âge, les signes habituels d'une excellente santé. De plus, les groupements d'écoliers se trouvent exposés à la tuberculose, comme toutes les personnes exerçant des professions sédentaires dans des appartements trop étroits. Ils manquent d'air et d'exercices musculaires, toutes conditions favorables à la dénutrition de l'organisme humain, précisément au moment de la vie où l'organisme a les plus grands besoins et subit les plus sérieuses dépenses. A tout cela se joint enfin le surmenage intellectuel: les Jésuites, dont nous parlions tout à l'heure, s'étaient proposé de donner dans leurs écoles un Cours complet d'éducation et de livrer à la Société un homme achevé. Puis, à mesure que le domaine des connaissances s'étendait, les programmes se sont surchargés au point de devenir follement encyclopédiques. Aujourd'hui l'éducation intellectuelle prend tout le temps des enfants et l'éducation physique est oubliée.

Si une telle méthode est mauvaise pour tous, elle est particulièrement désastreuse pour le malingre, le prédisposé, et c'est le vouer fatalement à la mort que de le laisser dans un pareil milieu. C'est alors que s'impose le devoir du médecin, d'autant mieux armé pour démêler les diagnostics précoces de la tuberculose que Landouzy, Grancher, Sanchez nous ont révélé les signes stéthoscopiques délicats de la période de la germination: que Bard, Faisans nous ont montré l'importance des rythmes cardiaques, de la tachycardie:

Rousset et Boix celle de la sensibilité scapulaire et des amyotrophies scapulo-thoraciques : que Bouchard, Béclère, Kelsch, Maragliano nous ont enseigné les signes radioscopiques de la tuberculose au début ; que Arloing, Mongour, Courmont ont établi, sur des bases certaines, le diagnostic précoce du tubercule par le "sérodiagnostic" par l'agglutination ; qu'Albert Robin et Binet nous donnent cette même certitude par l'analyse du chimisme respiratoire ; Sirot, Hutinel, Finck par l'observation des effets produits par les injections de sérum artificiel ; Gaube (du Gers) par l'étude de la déminéralisation des tissus. Darenberg et Chuquet enfin nous ont montré l'importance diagnostique des variations thermométriques diurnes chez les prédisposés, et Papillon celle de la neurasthénie prétuberculeuse.

Déjà d'ailleurs, en dehors des médecins, des hommes éminents se sont émus de ces conditions si défectueuses pour tous et ils ont tenté de réformer l'éducation moderne. Jules Simon, par exemple, rédigeait des circulaires où l'on peut relever des phrases comme celles-ci : "Je vous saurais gré, Monsieur le Proviseur, de tous les efforts que vous ferez pour donner à cette branche d'enseignement [les exercices physiques] si longtemps négligée, une importance proportionnée aux services qu'elle est appelée à rendre.

"Cet exercice charmera nos jeunes gens ; il faut qu'ils prennent plaisir à la gymnastique, au tir, à l'équitation ; notre plus grand succès sera de leur en donner le goût. Vous penserez comme moi que les exercices intellectuels y gagneront et que rien n'est plus favorable au développement de l'esprit qu'un corps alerte et dispos et des habitudes viriles.

"L'éducation physique est encore à créer en France et je vous supplie de m'y aider.

"Établissons des rapports nouveaux entre le développement du corps et celui de l'esprit, sans les sacrifier imprudemment l'un à l'autre."

Or, c'est à l'Angleterre que l'on a dû s'adresser lorsqu'on a voulu tenter en France cette réforme de l'éducation. Seule, en effet, cette nation a su s'affranchir des règles étroites de l'Université et résister à la manie de tout réglementer. L'étudiant libre a pu garder ainsi chez elle sa gaieté et le génie plein de fraîcheur de ses vingt ans. D'ailleurs qui est-ce qui pourrait s'en étonner ? Ne constatons-nous pas en effet, chez les animaux où les effets sont plus faciles à observer que dans la vie humaine, que les chevaux, par exemple, élevés au grand air, sont plus capables de résistance à la fatigue que les chevaux qui ont grandi à l'écurie ? Quoi qu'il en soit, l'expérience a prouvé la supériorité d'une telle méthode, puisque, nous l'avons vu, la tuberculose diminue dans des proportions notables en Angleterre.

Mais pour appliquer en France un pareil système, il a fallu chercher ailleurs que dans l'Université, qui reste figée sous le poids des siècles. Déjà Monsieur Lavisse, dans une conférence fort applaudie, insistait sur la nécessité de recourir à l'initiative privée : "C'est en dehors de l'Université, disait-il, en dehors des sentiers battus et des routines séculaires que la génération de demain pourra tremper ses résistances et ses audaces."—Les faits ont donné raison à Monsieur Lavisse. C'est Monsieur Demolins, en effet, qui, le premier, a eu l'idée courageuse de créer, en octobre 1899, l'école

des Roches à Verneuil, dans l'Eure, en se conformant aux principes de l'éducation anglaise, formulés ainsi par Cecil Reddie : "La vie entière de l'école est combinée de façon à développer harmonieusement toutes les forces du jeune homme, quelles soient physiques, intellectuelles, artistiques, morales ou spirituelles ; à lui apprendre en fait comment il doit vivre et devenir un membre sain, raisonnable et utile de la société humaine."

Nous sommes heureux de voir que cette idée est devenue féconde. En effet, sur plusieurs points du territoire, on a vu bientôt se multiplier les écoles organisées sur le modèle de celle de Verneuil. Près de Cannes, notamment, près de la Napoule, sous un climat et sous un ciel merveilleux, doit s'ouvrir, cette année même, l'école de l'Esterel. Le comité qui l'a fondée partage entièrement les vues de M. Demolins, sur la supériorité de l'éducation anglaise.

On conçoit immédiatement ce que peuvent être de pareilles écoles : avant tout, on a cherché à éloigner la jeunesse des foyers d'infection, à centrifuger, suivant l'expression pittoresque du Professeur Letulle, les enfants suspects, à leur donner surtout à profusion le soleil et la lumière qui sont les conditions essentielles de la vie.

L'école une fois installée dans un lieu salubre, on a voulu que les prescriptions d'hygiène y fussent fidèlement observées : en particulier l'hydrothérapie et les bains douches figurent parmi les articles essentiels du programme de M. Demolins. Puis on en a banni le surmenage intellectuel qui épuise les organismes ; on s'est appliqué à ne pas faire de l'enfant suivant le mot de Grasset "une petite monstruosité, ou curiosité plantée sur un arbre rabougri" —enfin le temps dérobé à l'étude, à la vie calfeutrée de nos établissements universitaires, y a été consacré au jeu et aux exercices physiques. Sans doute on ne veut pas faire de la race française exclusivement et sans transition, une race de sportsmen ; on s'est souvenu de cet avertissement de Darenberg : on s'use par le sport exagéré comme par le travail exagéré ou par le plaisir exagéré. Notre race n'est nullement entraînée comme l'est la race anglaise aux violents exercices corporels. Néanmoins, sans chercher à former des athlètes, on a voulu élever des hommes aptes à lutter contre toutes les misères physiques aussi bien que contre les difficultés de la vie.

Telles sont, Messieurs, les écoles dont vous nous avez fourni le modèle. Grâce à elles, on peut espérer vaincre la tuberculose et envoyer à la caserne des générations mieux préparées et plus résistantes. "La phtisie," écrit Pujade, "est un mal passager au moins dans son évolution actuelle. C'est le résultat inévitable et nécessaire de notre genre d'existence." Or ces conditions de la vie moderne, nous ne pouvons certes pas les changer complètement ; mais il n'est pas impossible de modifier la préparation à la vie. C'est à quoi tendent les écoles nouvelles ; nous pouvons donc conclure avec le Professeur Grancher : "Chaque peuple s'efforce d'opposer une barrière à la marche envahissante de la tuberculose. L'Allemagne et la Suisse luttent contre elle par le Sanatorium et l'Angleterre par le bifteck et le tennis. Je préfère la méthode anglaise, que je trouve plus agréable et plus efficace."

DIVISION II.

PART I.

THE INFLUENCE OF HOUSING AND AGGREGATION.

SECOND DAY, WEDNESDAY, JULY 24, 1901.

The Right Honourable Sir HERBERT MAXWELL, Bt., M.P., F.R.S. (President), in the CHAIR.

The CHAIRMAN: Ladies and Gentlemen,—The discussion to-day will be opened by a paper by Dr. Harold Coates, one of the Medical Officers of Health of Manchester. Manchester, I need hardly remind you, is perhaps in the van amongst towns in this country in the crusade against tubercular disease, in which it has been led by one whose name will be familiar to everyone in the room, Dr. Niven.

Paper on "An Investigation into the Presence of Infective Material in Dwellings occupied by Consumptive Persons," by Harold Coates, M.D., D.P.H. (Vict.), Senior Assistant to the Medical Officer of Health for the City of Manchester.

IT is now eleven years since Cornet published the result of his investigations into the infectivity of the dust found in the dwellings of consumptives in Berlin, and up to now no work of a similar character has been done in England.

In 1895, an investigation of this kind was commenced under the direction of Professor Delépine at Owens College, but was interrupted by other engagements.

The establishment of a scheme of voluntary notification of phthisis in Manchester in 1899 presented a favourable opportunity for taking up the investigation, and acting on the suggestion of Dr. Niven, for whose administrative scheme the reliability of Cornet's results was all-important, the Hospitals Sub-Committee of the Manchester Corporation resolved that I should carry out the work under the direction of Professor Delépine, who had previously offered me special facilities for resuming this investigation.*

Although the plan of the investigation is somewhat different, the methods of experimentation pursued were, in the main, similar to those of Cornet, although modified in some respects at the suggestion of Professor Delépine.

Specimens of dust were collected from situations in which dust from the

* I wish to state here that all the inoculations have been made by Professor Delépine or his assistant, Dr. Sidebotham.

atmosphere had settled naturally, and where there would be no likelihood of direct contamination with expectoration or by infected articles, except in the disinfection experiments. The following is a description of the methods of working employed in the investigation.

Samples of dust were taken from each house from the floors, skirting boards, walls, shelves, mantelpieces, etc., by one of the following methods:—

A.—The dust was taken from the floors, crevices between the boards and between the floor and skirting boards, from shelves and other similar situations, by means of a metal spatula, which was sterilised immediately before use by passing it several times through the flame of a spirit lamp until red hot, and then allowing it to cool.

By means of this sterilised spatula the dust was placed in a glass tube plugged with cotton wool, which had been previously sterilised in the autoclave, the cotton-wool plug being passed through the flame of the spirit lamp when opening and replugging the tube. The tube containing the dust was then carried in a sterilised metal box to the laboratory.

B.—Small pieces of sterilised sponge, carried in sterilised glass tubes plugged with cotton wool, were rubbed vigorously over an area of two square feet of wall surface, and then replaced in the tube and tube replugged with cotton wool. The cotton-wool plug was passed through the flame on opening and replugging the tube. Sometimes two or more pieces of sponge would be used for the same area of wall surface if this happened to be very dusty. The tube containing the sponge was then placed in a metal box and carried to the laboratory.

According to Cornet's estimate, the dust collected by rubbing over two square feet of wall surface would be the deposit from at least 306 cubic feet of air.

On arrival at the laboratory, the dust, or dust-laden sponge as the case may be, was well rubbed up with sterilised water, and the mixture filtered through sterilised muslin, so as to remove coarse particles which might otherwise block up the needle of the hypodermic syringe used for inoculation.

The emulsion thus obtained was centrifugalised, and a small portion of the deposit, spread on a covered glass, stained, and examined microscopically for tubercle bacilli.

In only two cases, out of a very large number of film preparations of the dust examined microscopically, were tubercle bacilli discovered.

This method was, therefore, practically useless for the discovery of tubercle bacilli in a specimen of dust.

Cultivation methods are also useless, because the dust contains many other organisms which would overgrow the slowly growing tubercle bacillus.

The method employed to determine the presence or absence of tubercle bacilli in the dust was that of the inoculation of a susceptible animal, viz., the guinea-pig.

The site of inoculation was on the inner aspect of the left leg, just above the level of the knee-joint, according to the method recommended by Professor Delépine in 1893, the advantages of this method being that the pathological changes produced by the inoculation of tuberculous material in this situation are very definite and constant, and that the mortality among the inoculated animals is comparatively small.

The houses in which investigations were carried out are classified into the following groups :—

I. Houses which are in a dirty condition, and in which a consumptive patient is living who is taking no precautions to dispose of his expectoration so as to prevent infection of the atmosphere, but who spits freely on to the floor or into his pocket-handkerchief, etc.

II. Houses which are in a very clean condition, but in which a consumptive patient is living who is not sufficiently careful as to the disposal of his sputa.

III. Very dirty houses, in which there has been no case of tuberculous disease for several years past.

In every house, the following details were noted :—

1. Date of visit.
2. Dimensions of the room examined.
3. Number of persons habitually occupying the room.

From these, the number of cubic feet of air space per head was obtained — two children being reckoned as one adult.

4. The conditions of light and ventilation.
5. The state of the walls, floor, and ceiling as regards construction and freedom from dust and dampness.
6. The presence or absence of carpets, curtains, or other objects which afford lodgment for dust.
7. Length of time patient has lived here, and duration of illness.
8. The presence or absence of visible signs of contamination, such as patches of recent or dried sputum on floors, walls, etc.
9. The situations from which dust was taken—always from such a place that direct infection with sputum would not occur.

It will therefore be seen that although, generally speaking, this investigation is on the same lines as that of Cornet, yet greater care has been taken to take account of all the factors which bear on the question.

As a result of the inoculations, many of the animals died of acute septic diseases; but it will be noticed that the mortality among my animals was much smaller than was the case in Cornet's experiments. Those which survived were killed about one month after the inoculation, and at once dissected, so as to show the lymphatic ganglia and viscera. Any morbid changes were noted in a book kept for the purpose, and cover-glass preparations were made from scrapings of affected glands and organs, and examined for tubercle bacilli.

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TABLE SHOWING ECTED HOUSES.

Number of experiment.	Cubic space per head.	Light and ventilation of animals.	Animals found to be tuberculous.	Animals found not to be tuberculous.
	cubic feet.			
1	280	fair	...	1
2	650	good	1	
3	380	poor	1	...
4	357	poor	...	...
5	650	good	1	...
6	616	good	...	...
7	300	poor	1	...
8	396	good	... 1	... ...

Houses to Class I.—Infected houses in a dirty condition.

Twenty-three houses of this class were examined, and the results are summarised in the accompanying Table.

Two of these houses can be excluded, because the results were inconclusive, as all the animals died shortly after inoculation, and microscopic examination of the dust was fruitless.

In another house (No. 6) both animals died shortly after inoculation; but in this case examination of the dust revealed the presence of tubercle bacilli, and this may be accepted as evidence that the dust was infective. Therefore there are 21 houses in which definite results were arrived at. In 13 of these houses at least one animal was found to be tuberculous, and in another house (No. 6) tubercle bacilli were present in the dust; and, therefore, in 14 out of the 21 houses, *i.e.*, in 66·6 per cent., the presence of infective dust was proved which had at one time been suspended in the atmosphere, and therefore was capable of being inhaled. In seven of the houses there was no evidence that the dust was infective.

Altogether, 52 guinea-pigs were inoculated with dust from these houses.

20 of these died within a few days of inoculation.
17 were killed four to five weeks after, and found to be tuberculous.
15 " " " " healthy.

It will be noticed that a large proportion of the animals died from acute infective diseases within two or three days of the time of inoculation, and, therefore, were useless as far as demonstrating the presence or absence of tubercle bacilli in the material with which they were inoculated was concerned.

It is very probable that some of these animals would have developed tuberculosis had they survived for three or four weeks.

The large proportion of houses—66·6 per cent.—in which the presence of virulent tubercle bacilli was proved shows what a dangerous accumulation of infective material there is in this class of house.

The effects of overcrowding are not apparent in these results, possibly because the series of houses is too short. In the 14 rooms in which positive results were obtained the average cubic space per head is 457 cubic feet, while in the cases of the seven rooms which did not yield positive results the average cubic space per head is less, viz., 368 cubic feet.

The cubic space per head is chiefly of importance in connection with the provision made for renewal of the air of a room.

A large cubic space is of little avail if the ventilation is bad.

The effects of fresh air and sunlight on the vitality of the tubercle bacillus are well known.

Taking the conditions of lighting and ventilation in those 21 houses which gave results either negative or positive, we find that out of the 14 positive houses the lighting and ventilation were bad in eight houses, fair in one house, and good in only five; while of the seven negative houses, the lighting and ventilation were good in six and fair in the other one.

In none of the houses with negative results was the lighting and ventilation poor or bad. These facts point strongly to the beneficial effects of light and air, even in the dirtiest houses, where the conditions are certainly not favourable to their action.

In 16 of the houses samples of dust were obtained at different elevations in the room, so as to learn at what points the most dangerous accumulations of infective material were to be found.

As was to be expected, those samples of dust taken within one or two feet of the floor produced tuberculosis oftener than samples taken at higher elevations.

In these 16 houses tuberculosis was produced by 13 of the 32 samples collected.

Nine of these 13 samples were taken from near the floor, and the other four at an elevation of five to six feet from the floor.

This greater infectivity of the dust nearest the floor was not due to direct infection with sputum, as all the samples were collected from places where this could not occur.

Certain parts of the floor, *e.g.*, near the bedside and near the fireplace in living rooms, are the places where the sputum is deposited in largest amount, and where the pulverisation most readily occurs.

When pulverised, it is probable that only a comparatively small proportion of the dust will rise to the highest parts of the room; and even if it does so, much of it will ultimately settle near or on the floor, so that the lower parts of the wall and projections (top of skirting board, etc.) near the floor are most favourably situated for receiving accumulations of such dust.

It is difficult to compare these results with those obtained by Cornet in Berlin, as in most cases he does not say anything about the condition of his houses as regards cleanliness, and in no case does he give particulars of the lighting and ventilation or the conditions as regards overcrowding.

Of the houses which he investigated where the patient was in the habit of spitting on the floor, etc., he states that nine were in a dirty condition.

In the cases of two of these houses all the inoculated animals died early. Of the remaining seven, five, or 71·4 per cent., gave positive results, and the other two gave negative results.

Considering the small number of houses (seven), this result (71·4 per cent.) agrees fairly well with the result of my investigations, viz., 66·6 per cent. positive in 21 houses.

Series II.—Clean but infected houses were next investigated.

Houses which are in a very clean condition, but in which a consumptive patient is living who is not sufficiently careful as to the disposal of his expectoration.

The accompanying Table shows the results obtained from these houses.

Ten houses of Class II. were brought under examination and two samples of dust were taken from each house, and each sample was used to inoculate one guinea-pig.

Microscopical examination of the dust was not carried out in these experiments, as the results in previous experiments were so very unsatisfactory.

Twenty guinea-pigs were inoculated, and of these only three died from acute diseases shortly after inoculation.

Of the remaining 17 animals, six developed tuberculosis, and 11 were found free from tuberculosis at the post-mortem examination.

Of the ten rooms examined, dust capable of producing tuberculosis on inoculation into a susceptible animal was found in five; in one case both animals belonging to that room became tuberculous; in the other four rooms one animal only became affected.

Thus, even in the cleanest of houses, infectious dust can be found in 50 per cent. of cases when the phthisical occupant is using his pocket-handkerchief or the floor as a receptacle for sputum.

It is therefore evident that ordinary cleanliness alone is not sufficient to prevent the accumulation of infectious material in the rooms occupied by a consumptive.

The average cubic air space per head in those rooms where infective dust was obtained was equal to 336 cubic feet, and in those rooms which gave negative results 506 cubic feet.

In these houses the influence of air space seems to be greater than in the dirty houses of Class I., but here also we must consider air space in connection with the ventilation of the room.

In the five houses where the dust was not infective, we see that in every instance the lighting and ventilation were good.

On the other hand, of the five houses which gave positive results on inoculation of their dust, only one had good lighting and ventilation, two had bad light and ventilation, and in two the lighting and ventilation were described as fairly good.

Taking the houses of Class I. and Class II. together, the influence of sunlight and fresh air in the prevention of accumulations of infective dust is shown very markedly.

In these houses, also, the tendency of the infective dust to settle towards the lower parts of the room is shown.

Of the six tuberculous guinea-pigs, four were inoculated with dust taken from or near the floor, and only two with dust taken at an elevation of five or six feet.

The small number of guinea-pigs dying twenty-four to forty-eight hours after inoculation would seem to show that other organisms than the tubercle bacillus are not so numerous in the clean as in the dirty houses.

Of the houses containing careless or ignorant patients which Cornet examined, he describes 12 as being clean.

TABLE SHOWING RESULTS OBTAINED FROM HOUSES OF CLASS II., *i.e.*, CLEAN BUT INFECTED HOUSES.

Number of Experiment.	Cubic space per head.	Light and Ventilation.	Number of samples of dust collected, and place from which sample was taken.	Number of animals inoculated.	Animals which died shortly after inoculation inconclusive.	Number of days after inoculation when animals were killed.	Animals found to be tuberculous.	Animals found not to be tuberculous.
21	350	fair	2 { A, 5 feet from the floor	1	...	33	1	...
			B, from the floor	1	...	33	1	...
22	240	good	2 { A, 6 feet from the floor	1	...	33	..	1
			B, near the floor	1	...	33	...	1
23	600	good	2 { A, 6 feet above the floor	1	...	33	...	1
			B, 1 foot above the floor	1	...	33	...	1
24	257	poor	2 { A, 6 feet above floor	1	1	...	...	...
			B, from the floor	1	...	34	1	...
25	450	good	2 { A, 6 feet above floor	1	1	...	...	...
			B, 1 foot above floor	1	...	31	...	1
26	280	fair	2 { A, 6 feet above floor	1	...	30	...	1
			B, near the floor	1	...	30	1	...
27	525	good	2 { A, 5 feet above floor	1	...	30	...	1
			B, from the floor	1	...	30	...	1
28	300	good	2 { A, 6 feet above floor	1	...	42	...	1
			B, from the floor	1	...	42	1	...
29	715	good	2 { A, 6 feet above the floor	1	1	...	...	...
			B, 1 foot above the floor	1	...	42	...	1
30	496	bad	2 { A, 6 feet above the floor	1	...	38	1	...
			B, 1 foot above the floor	1	...	38	...	1

In three of these houses he got no definite results, as all the animals died a few days after inoculation.

Of the remainder, he got positive results in five houses and negative in four.

Therefore, 55 per cent. of Cornet's houses of this class contained dust proved to be infective, as compared with 50 per cent. in my cases.

Considering the small numbers under consideration, these results may be looked upon as practically agreeing.

A better comparison is made by taking houses of Class I. and Class II. together as houses containing patients who are infecting the atmosphere and ignoring the conditions as regards ordinary cleanliness.

Altogether Cornet examined 34 houses.

In six of these the results were inconclusive, because all the animals died shortly after inoculation, and, therefore, for purposes of comparison, 26 houses are left.

I have examined 33 houses, of which no definite results have been obtained from two, leaving 31 houses for purposes of comparison.

These results are seen in the following table:—

Berlin.				Manchester.			
Number of houses examined.	Positive results.	Negative results.	Percentage of positive results out of total.	Number of houses examined.	Positive results.	Negative results.	Percentage of positive results out of total.
28	19	9	67%	31	19	12	61%

These experiments show that there is a large amount of highly-infective material present in dwelling-houses which are inhabited by consumptive patients who do not take the necessary precautions to destroy their expectorations.

It is asserted by some that the tubercle bacillus is almost universally present in the air and in dust, both of house and other places.

Cornet, however, failed to find it in streets and in places such as waiting-rooms, which are used only occasionally by consumptives.

In order to determine whether the tubercle bacillus is generally present in houses which are not inhabited by consumptive patients, I have carried out a series of investigations in houses corresponding to those of Class I., except that there was no case of tuberculosis in them.

Very great care was exercised so as to be quite sure that tuberculosis was excluded, and only those houses were used in which a complete history of the inmates could be obtained for at least three years. I had the opportunity of seeing most of the occupants of these houses, and so was able to come to a conclusion as to their state of health.

Any house where there had been a case of bronchitis or lung affection,

meningitis, marasmus, strumous glands, or any case of bone tuberculosis, was excluded.

This part of the work was really the one which involved the greatest amount of labour and care, as a very large number of houses had to be investigated before a sufficient number could be obtained in which these requirements were complied with. Cornet gives very little information on these points.

The houses chosen for these investigations were all very dirty, and were exactly similar to those of Class I., except that the consumptive patient was absent. Many of them were badly lighted and ventilated, and in all of them there was plenty of dust and dirt on the walls, floors, etc.

Below are the results of these experiments.

Ten houses were examined, and in no case was any tuberculous dust discovered.

Twenty guinea-pigs were inoculated with dust taken from these houses, and six of these died within a few days of inoculation.

The remaining 14 were killed four to five weeks after inoculation, and all were found free from tuberculosis.

These results, taken in conjunction with the results obtained from houses in Class I. and Class II., show that the virulent dust found in those houses is due to the presence of a consumptive patient, who is infecting the atmosphere with his expectorations.

These experiments show that living and virulent tubercle bacilli are present in the dust, which has deposited itself naturally from the atmosphere, in rooms which are occupied by phthisical patients who are in the habit of spitting upon the floor or into pocket-handkerchiefs.

They also seem to show that this infective dust is present in greatest amount or is most virulent where the access of sunlight and the free circulation of air is prevented.

Such infected rooms must be a source of danger to those occupying them. Healthy persons run the risk of being infected, and the patient himself may become reinfected and his ultimate recovery be delayed or prevented.

It is well known that the tubercle bacillus can retain its virulence for months in the dry state; it is evident, therefore, that these houses will remain infective for some considerable time after a patient leaves it.

Unless there are some measures taken to remove this infective dust, a new tenant coming into a house lately occupied by a consumptive patient is exposed to the danger of acquiring phthisis.

In the poorer quarters of large cities, where houses are too few for the needs of the population, the new tenant often takes possession the same or the following day that the late tenant leaves, and nothing in the way of disinfection or cleansing the walls and ceilings is done.

There is no doubt that many persons are in this way unknowingly exposed to infection, and an infected dwelling is in many cases the origin of a case of phthisis which the most careful inquiry has failed to trace to any direct association with a previous case.

TABLE SHOWING THE RESULTS OBTAINED FROM HOUSES OF CLASS III., *i.e.*, DIRTY, BUT NOT INFECTED HOUSES.

Number of experiment.	Number of years during which there has been no case of tuberculosis in the house.	Light and ventilation.	Number of samples of dust taken, and places from which samples were taken.	Number of animals inoculated.	Number of animals dying shortly after inoculation.	Number of days after inoculation when animals were killed.	Animals found to be tuberculous.	Animals found not to be tuberculous.
31	5 years	fair	2 { A, at a height of 6 feet	1	...	37	...	1
			B, from floor	1	1 (9 days)	...	...	...
32	11 years	good	2 { A, 6 feet high	1	...	37	...	1
			B, 1 foot above the floor	1	1 (8 days)	...	...	...
33	35 years	fair	2 { A, 5 feet above the floor	1	...	36	...	1
			B, 1 foot above the floor	1	...	36	...	1
34	3 years	bad	8 { A, 6 feet above the floor	1	1	...	...	...
			B, near the floor	1	...	36	...	1
35	3 years	fair	2 { A, at a height of 6 feet	1	1	...	...	...
			B, near the floor	1	...	34	...	1
36	9 years	bad	2 { A, 6 feet from the floor	1	1	...	...	...
			B, from the floor	1	...	34	...	1
37	6 years	fair	2 { A, 6 feet from the floor	1	...	34	...	1
			B, near the floor	1	...	34	...	1
38	3 years	bad	2 { A, at a height of 6 feet	1	...	29	...	1
			B, from the floor	1	...	29	...	1
39	18 years	good	2 { A, 6 feet from the floor	1	1 (12 days)	...	...	1
			B, near the floor	1	...	29	...	1
40	5 years	good	2 { A, 5 feet from the floor	1	...	33	...	1
			B, near the floor	1	...	33	...	1

The same danger exists to some extent at the boarding houses and hotels at health resorts.

Samples of dust collected from various public places have also been examined.

Five specimens of dust were collected from the walls at various elevations of the waiting-room of the out-patients' department of the Hospital for Consumption in Manchester. This waiting-room, which is a lofty, well-lighted, and well-ventilated hall, is used by one hundred and eighty patients every morning.

Ten guinea-pigs were inoculated and killed five weeks afterwards. None of them showed any signs of tuberculosis.

Five samples of dust were also examined from the waiting-room of one of the large general hospitals, and here also the results were negative.

Dust taken from railway carriages failed to produce tuberculosis, but two samples taken from a general waiting-room at a railway-station both produced tuberculosis.

Of four samples of dust taken from the tap-rooms of two small public-houses frequented by the labouring classes, one was found to produce tuberculosis. Time did not permit this branch of the investigation to be continued, but there is other evidence that these small beer-houses in most cases contain a large amount of infective dust.

The Disinfection of Tubercle-infected Houses.

The methods of disinfection in use in Manchester is one recommended by Professor Delépine eight years ago, as a result of experiments which he carried out to test the efficiency of various disinfecting processes. The method is that of disinfection by a solution of chlorinated lime.

A solution of chlorinated lime of the strength of $1\frac{1}{2}$ ounces to the gallon is used.

The wall-paper is thoroughly saturated with this solution, applied with a soft brush, and is then stripped from the walls.

The bare walls, the ceiling, and floor are washed over several times with the solution, and any articles of furniture which will admit of such treatment are similarly washed over.

Articles of clothing, bedding, etc., are taken away to be disinfected in the steam disinfector.

I have also carried out some experiments in order to test the efficiency of the chlorinated lime method of disinfection as practised in Manchester, which is that recommended by Professor Delépine.

Pieces of sterilised paper were infected by smearing them with tuberculous sputum, and allowed to dry in the dark. They were then placed in sterilised capsules until required for the experiment.

Pieces of this infected paper were pinned to the walls and doors in different parts of a room about to be disinfected.

The disinfection was then carried on in the ordinary manner, and the test

TABLE SHOWING RESULT OF DISINFECTION WITH CHLORINATED LIME SOLUTION, STRENGTH 1½ OZ. TO THE GALLON.

Number of experiment.	Test cards smeared with sputum.	Date of disinfection.	Date of inoculation and material inoculated.	Number of days after inoculation when animals were killed.	Result of inoculation.
45	July 10, 1900 (Control experiment No. 44)	July 11, 1900	July 12, 1900		
			A, scrapings from the disinfected test cards	35	—
			B, dust and dirt from the disinfected room	35	—
46	Do.	Do.	July 12, 1900		
			A, scrapings from the disinfected test cards	35	—
			B, dust and dirt from the disinfected room	35	—
47	Do.	Do.	July 12, 1900		
			A, scrapings from the disinfected test cards	35	—
			B, dust and dirt taken from the room after disinfection	35	—
49	July 15, (Control experiment No. 44)	July 16,	July 19, 1900		
			A, scrapings from the disinfected test cards	35	—
			B, dust and dirt taken from the room after the disinfection	35	—
50	Do.	Do.	July 19, 1900		
			A, scrapings from the disinfected test cards	35	—
			B, dust and dirt taken from the room after the disinfection	35	—

CONTROL EXPERIMENTS.

Number of experiment.	Test Cards smeared with sputum.	Date when scrapings from these cards were inoculated into guinea-pigs.	Number of animals inoculated.	Number of days after inoculation when killed.	Result of inoculation.	These cards used in experiments.
44	July 10, 1900	July 12, 1900 . . .	2	35	+	45
					+	46
						47
48	July 15, 1900	July 19, 1900 . . .	2	35	+	49
					+	50

papers were exposed to the action of the disinfectant, just as were other parts of the room.

These papers were allowed to dry naturally, and the infected portions were well rubbed up into an emulsion with sterilised water, and inoculated subcutaneously into guinea-pigs.

Dirt and dust were also collected from crevices in the window frames, skirting boards, etc., of rooms which had been disinfected, and were used to inoculate guinea-pigs.

Control experiments were made with portions of the same infected paper which had not been exposed to the action of the disinfectant.

All the houses in which these experiments were carried out were very dirty houses, which had been infected by phthisical patients spitting about the floors, etc.

In not a single instance was there the least trace of tuberculosis in any of the animals inoculated with the disinfected papers. In every case, therefore, disinfection proved to be efficient. The control experiments all produced very well-marked tuberculosis. In houses which are in a clean condition, and where it is certain that there has been no direct soiling of the walls or floors with sputum, and where the infectious dust, if present, has come from soiled pocket-handkerchiefs or articles of clothing, the chlorinated lime method of disinfection is not considered necessary, and the method of disinfection recommended by Esmarch is practised.

The wall-paper is rubbed well with crumb of bread, or with dough kneaded to a proper consistency.

Floors, painted walls, and woodwork are washed with soap and water, and ceilings are limewashed.

In addition, bedding, articles of clothing, etc., are either disinfected by steam or washed with boiling water.

This method of disinfection, when properly carried out, in five houses was found to remove practically all dust from a room, so that little or no dust can be obtained by subsequently rubbing the wall-paper with a sterilised sponge.

The method, however, requires a certain amount of care to make sure that all dust is removed from the walls, especially from the angles and corners, and to properly rub down a fair-sized room takes a considerable time.

This method of disinfection is useless in cases where the paper is directly soiled with sputum.

Owing to the mucus which it contains, the dried sputum sticks tenaciously to the paper, in spite of repeated rubbing with dough. I have actually obtained good preparations showing abundance of tubercle bacilli from pieces of wall-paper which were soiled with sputum, and which hadbeen cleaned with dough. I obtained these preparations from five separate houses.

This method of rubbing the walls with dough is an excellent way of periodically cleaning a room, so as to keep it free from dust.

As regards the disinfection of tubercle-infected houses, the direct applica-

tion of a solution of chlorinate lime to the walls, ceilings, and floors is an efficient and cheap method of disinfection.

When the solution is not stronger than 1½ oz. to the gallon, its use is attended with practically no discomfort to those who have to carry out the disinfection.

DESTRUCTION OF TUBERCULOUS SPUTA.

By Professor SCHRÖTTER, *Vienna.*

Gentlemen,—I do not propose to give you a lecture on high medical science; but I intend speaking of a matter which is certainly of great importance, as it concerns the possibility of infection from tuberculosis.

It is necessary to busy ourselves with the best method of getting rid of the sputum of consumptive people.

I think the best way is not to throw the sputum, well or badly disinfected, away, but to try to destroy it completely. *That can only be accomplished by burning.* We arrange this at my clinic in Vienna and at our sanatorium at Alland in two ways.

For the *patients walking about* in the house or garden we only use *Dettweiler's* spitting bottles; you will not see in the whole establishment at Alland any spittoon or receptacle for expectoration, and I can assure you there is no difficulty in it; all our patients belonging to the lower classes are soon educated in this sense.

But *Dettweiler's* bottle, excellent in every respect, is very dear and costs the establishment every year a not inconsiderable sum. Now, I think it is of very great importance to bring the new method of getting rid of the sputum among the great masses of the people into the cheapest and the simplest form. Mine cost 1*s.*, and if I reckon 2*d.* for the poor, it makes 1*s.* 2*d.* less than any other such apparatus. I tried, therefore, to get something at the most moderate price possible, and altered at the same time the system in a somewhat improved manner. I do not pretend at this moment to lay before you anything absolutely perfect, and I am sure that the practical common-sense which is so highly developed in this country will soon find out something better when once the idea is settled.

The first thing on which I place some real weight is that my bottle is made entirely of glass in every part which comes in contact with the sputum. A second fact is that my bottle can easily be manipulated with one hand. This is attained by one or other simple arrangement. I show you here the one in which the lid is opened and closed by an ordinary fastener, and the second by a sort of screw spring.

For the *patients lying in bed* we use spittoons of papier-maché impregnated with a little paraffin, and partly filled with a small quantity of powdered turf. They are made at a very low price by the firm of Louis, in Vienna.

After they have been used the contents of the bottles, and the papier-maché spittoons themselves with the contents, are mixed with powdered turf

and thrown into the fire. Notwithstanding that these spittoons have answered our purpose for the last three years, I have thought it might be possible to simplify them. I show you here vessels made of turf to replace the papier-maché.

But although turf has the excellent, and for our purpose very valuable, quality of being very porous, it possesses the bad quality of allowing the fluid to run through. I am making different experiments to solidify the outer surface, but I can only tell you that the method which I have now adopted is the best and, what is of greater importance, the cheapest. It is the painting the outside with a coating of soluble glass (silicate of soda, etc.) or, still better, of asphalt.

I am quite sure that something better will easily be discovered, but it must always be in accordance with four essentials: easily sucking up the sputum, holding it well, being burnt without difficulty, and costing very little.

I only wanted to excite your interest on the subject, and shall be glad if anyone will find out something perfect to accomplish the desired object.

LIGHTING, VENTILATION, AND AGGREGATION IN RELATION TO THE PREVENTION OF TUBERCULOSIS.

By JOHN ROBERTSON, M.D., B.Sc.
Medical Officer of Health, Sheffield.

There are in every community individuals who may be placed as regards tuberculosis in one of three groups:—

1. Those who are actually infected.
2. Those not infected, but who are susceptible.
3. Those not infected, but whose power of resistance is sufficiently good to ward off any infection, except in very unusual circumstances.

We have no definite information that any member of the human race is entirely immune. From analogy with what occurs in the animal kingdom, one would say that theoretically none are immune, but practically many are.

It is, of course, impossible to give exact figures as to the number of persons who should be placed in each of these groups.

From our information obtained as a result of notification of tuberculosis in Sheffield and our mortality statistics, it is probable that about five persons in every thousand are infected with tuberculosis in one or other form at the present time.

From careful inquiries made in the case of 408 deaths from tuberculosis of the lungs, in each of which the family history could be ascertained as far back as the grandparent, it was found that in 33 per cent. of the cases definite histories were obtained of one or more previous cases in the blood relations. I think one is justified in saying that in over 33 per cent. of our adult population there is an hereditary liability to the disease, and if we add to this

number those who are susceptible to infection without any family history, the number of persons in group II. is indeed a very large one.

I must admit that the figures I have given are very crude, but the point I desire to be recognised is that the number of persons who require to be safeguarded from tubercle is very large indeed.

It is important to prevent the spread of infection, and to arrest the disease in those infected. I feel that much better results will be obtained by endeavouring to so strengthen the resistance of those who are liable to the disease as to make them practically immune than by any other means.

By recognising the importance of strengthening resistance more has been done in the past and will be done in the future than by any crusade against the infection spreading by dried sputum, etc.

The question occurs as to whether it is reasonably possible to raise the standard of resistance without unduly interfering with the liberty of the subject, or rather with the liberty of owners of property and owners of works.

In considering this all-important subject we have to look into two questions: 1. As to what part environment plays in the spread of tuberculosis. 2. As to the evidence which exists that "proper environment" in man and the lower animals is capable of not only warding off the disease but arresting it when infection has occurred. The consideration of such questions gives us great hope that much more can be done in the near future than in the past.

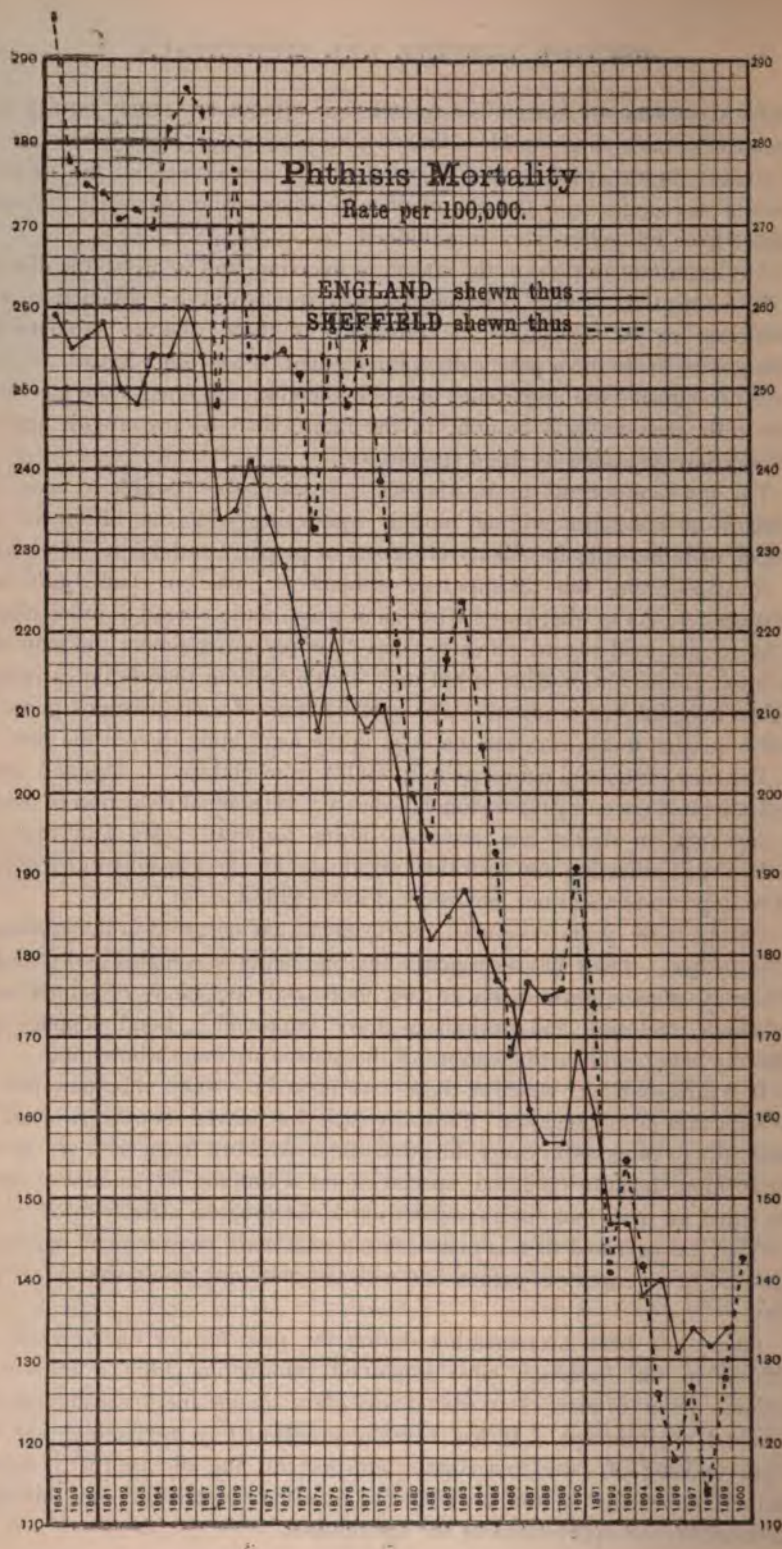
The now oft-quoted figures as to mortality from phthisis in England since 1858 are most encouraging, seeing that the very substantial reduction of nearly 50 per cent. in deaths has occurred during forty-two years, and that the whole of this reduction has been due, not to special effort against tuberculosis, but to improvements in our environment in its widest sense.

During these years enormous improvement has occurred in the condition of the people. There has been better housing, better scavenging and draining of houses, great improvements in the hours and conditions of labour, and workshops, factories, and workplaces have improved. Food supplies are infinitely better, and the recreations of the masses are more wholesome.

It is difficult to say which of these have played the more important part in the reduction of tuberculosis. Probably each has played its own part, and in future it is to progress in every direction which tends to make the lives of the people more healthy—plus our special efforts in limiting the amount of infection—that we must look for a continuation of the progress already made.

What has occurred then is that during recent years environment has been improved to an enormous extent, and with the gratifying result shown on the chart.

There has been accumulating during the past ten or fifteen years, in addition to this evidence, most important information from a preventive medicine point of view as to what takes place among the lower animals by improved environment. It has been demonstrated so frequently that the proper housing of cattle to a large extent prevents the disease that it is now common knowledge in the medical and veterinary profession; but this is, I regret to say, not appreciated by the agriculturist.


Phthisis Mortality
Rate per 100,000.
ENGLAND shewn thus
SHEFFIELD shewn thus
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110

The demonstration, too, that tuberculosis in cattle is not of itself hereditary is most important. The contrast which is everywhere seen between milk cows housed in dark, more or less dirty, overcrowded, and badly-ventilated cowsheds acquiring with great readiness all forms of tubercular disease on the one hand, and on the other hand in the same district, and from the same stock, the condition of bullocks fed in the open for the most part, and not undergoing the exhausting process of milking, suffering little, if at all, from the disease, is very marked.

Nobody can intelligently examine our herds without being struck by the great importance of good environment in preventing tuberculosis.

Those of us, too, who have given careful attention to the question of the open-air treatment of delicate consumptives must have been impressed with the methods which must be generally used in warding off the disease—good air, light, and food.

The prevention of tuberculosis then divides itself into two main methods of attack: (*a*) Limiting the spread of infection from man and animals. (*b*) Strengthening the resistance of every individual to a point that will prevent the bacillus doing damage. As already mentioned, the way in which the open-air treatment strengthens resistance to a point that those already infected, if not too far advanced, have their disease arrested, if not actually cured, is our best indication as to the line of attack we have to adopt.

LIGHTING.

Lighting of dwellings and workplaces does not alone depend on the amount of window space. In this country very little attention has been paid to the subject, and except that in sanatoria and hospitals it has been found by the medical profession that good lighting aids recovery, and in the case of schools that efficient lighting is necessary for the best mental work, little or no attempt has been made to insist that in dwellings, houses, and workplaces there should be a sufficiency of light. A very large number of persons now work in offices, warehouses, kitchens, etc., which have either no daylight or very little, while many others have to spend long hours in ill-lighted work-places or houses. The dull, anæmic-looking individuals who come from such places are well known to every medical man. So, too, is the feeling of lassitude and the liability to fall victims to disease of various kinds well known.

I believe that the want of attention to this subject is mainly due to the absence of any accurate method of measuring light. If it were possible to say that in any living or work room the amount of daylight was deficient, it would make it an easy matter to take action to improve it.

The action of light on the human subject is not by any means due to the so-called chemical rays, or to its bactericidal properties, although both of these are valuable adjuncts to the visual intensity of light. If I may say so I think there is a tendency to over-estimate the bactericidal effect of light. Light shows up dirt of every kind, it increases our feeling of well being, and therefore strengthens our resistance.

I believe that it is possible to arrive at a standard of lighting by comparing the visual intensity of light inside of a room with that in the same direction and with the same exposure outside. Some means are urgently needed to enable us to determine these data, taking the outside light as 100 per cent. If, then, houses, workshops, offices, and warehouses were dealt with where the percentage of available light was below the standard, an immense stride would be made.

In many cases a covering of tar and soot on the windows of town buildings shuts out nine-tenths of the photographically active light. Again, the vicious custom cropped up some years ago of glazing the top portions of some windows with coloured glasses, thus shutting out much valuable light in a country where for at least six or eight months every year all available sunlight is required.

The presence of adjoining high buildings or buildings of a dark colour make the houses of the working classes in our towns dull and depressing. In some cases the lighting can be improved by taking the light which is now absorbed by our dull red bricks and reflecting it into the houses. This is being done to a considerable extent in the case of the better-class buildings in London, but for the houses of the poor and the workplaces of the multitude all over the country nothing is done.

I believe that all buildings not receiving daylight direct—such as cellars, warehouses, etc.—should not be used for dwelling purposes, and that work in such dark places should be limited to a very few hours per day by any individual. The condition of work in such buildings is entirely different from that in coal-mines, where the miner has a considerable amount of air supplied, and where he is working with a sterile material in sterile surroundings. No attention is paid to the lighting of workshops and factories. The windows in such places are notoriously dirty, and it would at present be resented very keenly by most manufacturers were it to be suggested that the windows should be cleaned once every week. Yet in towns the housewife finds it necessary to clean her windows thus often. I think an effort ought to be made to insist on cleanliness of windows in workplaces, and that the point already mentioned of getting a standard of lighting should be pushed on with.

Ventilation—Aggregation.

The very difficult subject of ventilation is largely neglected in this country owing chiefly no doubt to our variable temperature and to the fact that theory and practice in ventilation do not always run together.

While this is so a great deal can be done to improve immensely the air supply to the people. To begin with nobody can justify the way in which buildings used for houses or workplaces of one kind or another are being erected in all our large towns at the present time.

[*Here some examples of recently erected factories and houses were described which could not possibly get sufficient fresh air.*]

The conditions as to lighting and ventilation of this city are probably as good as in any other. I would only ask you to go and see the new buildings that are being erected and see whether there is a high enough standard of lighting and air space being adopted to meet with our requirements in attempting to prevent tuberculosis.

A very potent factor is in operation now in spreading the population in trains, swift electric cars, motor cars, and probably tube railways.

In Sheffield an excellent scheme is in operation of providing electric trams to carry the people from anywhere in the centre of the city to anywhere in the suburbs for one penny, irrespective of the distance. I anticipate that this will greatly reduce the overcrowding in the centre of the city. But in addition to this we want prohibition of erection of buildings in such a way as to prevent them having a free supply of air both in front and at the rear. The question really is—Is our present standard of air space about all buildings sufficient? and I think the reply must be in the negative.

The ventilation of dwellings is a very difficult subject to deal with. The personal equation will arise in each case, and it is probable that a great deal of educational work will be needed before much can be accomplished. I think that the knowledge that delicate consumptives are treated in the open air, and that their salvation depends on fresh air, will act most powerfully in the near future. If sanatoria for the working classes were useful in no other way I think they would be useful in spreading information that fresh air arrests and prevents consumption.

Sanatoria will increase in numbers, and I hope that in every case their value will be increased by local institutions which will help those who have had their disease arrested to get into well-lighted and well-ventilated houses and workplaces. And again, that numerous groups of consumptives, in whom the disease is too far advanced for sanatorium treatment, must be impressed with the fact that their best chance lies in living in well-lighted and ventilated houses, practically carrying out the open-air treatment at home. These will be object-lessons which I doubt not will be of value to many persons.

There is one question in regard to ventilation which is not satisfactory at present, *i.e.*, our fixed standards of air space in workshops. The act does not recognise any difference between places where sedentary trades are carried on and those where considerable physical exertion occurs. The carpenter or blacksmith who is at work does not feel cold or draughts nearly so readily as the seamstress or typesetter or clerk, and therefore it is important if any real attempt is to be made to give these workers a pure air supply that more space should be allowed to the one group than to those of the other.

I am not aware how the 250 cubic feet of air space per worker came to be adopted in all factories and workshops as a minimum. It may be all right in certain cases, but such standards when set up are always used as maxima. An architect in planning a workshop now regulates his building on the assumption that he must give 250 cubic feet and not more or less for every worker.

Undoubtedly more air space is needed in a great many workshops. In the sedentary occupations windows cannot be used as ventilators in winter, and therefore it is better always to insist on inlets of the type of the Sherringham valve.

I see no practical difficulty in putting the responsibility of providing and maintaining efficient ventilation on the owner or occupier of the workshop by simply insisting that at all times the CO_2 present shall not exceed a given amount, when this amount is determined by a recognised method. For practical purposes CO_2 is quite a good indicator if a proper method is used for its determination. Air space and openings would then have to be neglected, and the all important thing would be the condition of the air itself.

Cleansing.

The cleansing of workshops and factories and other workplaces is a matter which the employer in a good many instances never dreams of. We have of course power to see that workshops are properly lime-washed, and it is the fault of the local authority if such places are not properly lime-washed at stated intervals. In a few trades it is necessary for the floor of the workshop to be of cinders, but in the vast majority of cases floors are of washable material, and are never washed from one year's end to another. Some time ago I looked into the question of having the floors of milliners' and dressmakers' shops and of tailors' shops and bakehouses washed. I found that in many cases such was resented very keenly; spitting on such floors is a common custom, but the filth could never be efficiently removed as only dry brushing was resorted to. I have asked that the floors and benches be washed once every month, and that the floors, walls, benches, etc., be dusted every day. In a great many cases we have found employers quite reasonable in regard to this, but many others have neglected it or have done it in a half-hearted manner. From what we know of the propagation of tubercle by dust I feel very strongly that this cleansing of workplaces should be enforced. The object-lesson to workers of having to work in places with clean floors and benches and with clean windows will be valuable in regard to their home conditions. A good deal can be done in the homes of the people by the employment of skilled and educated women inspectors, whose duties should be limited mainly to the question of seeing that reasonable cleanliness is observed inside the houses. My own experience is that this work is so much more valuable when carried out by better-class women that I should not advise the general employment of women of the working classes as health visitors.

The points which I should like to draw your attention to specially are :—

I. The attainment of some standard of lighting.
II. The attainment of some standard of CO_2 in places where persons are employed.
III. The question of obtaining better air space around occupied buildings.
IV. The question of cleansing workshops and places of employment.

The PRESIDENT: Ladies and Gentlemen,—I could not help reflecting, while we were listening to Dr. Robertson's most interesting paper, how much unconscious truth there sometimes is in an old proverb. I think if Dr. Robertson wishes a motto for his paper he ought to take the Italian one, "Where the sun does not go the doctor will."

Dr. RUFENACHT WALTERS, *London:* Mr. President, Ladies and Gentlemen, —I do not propose to read the paper which is put down against my name for a double reason. In the first place, I have not received it from the printers, and, in the second place, we have been reminded that the time is short, and I must accommodate myself to the circumstances.

I should like to say a word about the very interesting speech which was delivered by Professor Schrötter, because I think I can suggest an even cheaper and simpler method of receiving and dealing with the sputa than is given by him. It consists simply in this: use a galvanised iron mug, which has not to be paid for over and over again, but which can be obtained at a very small cost, and will always be useful. Put into it some waterproof paper, such as butter paper. This method has been practically tried in a place in which I am interested for some time past, and has been found to answer admirably. You can put a piece of the butter paper into the spit cup; you can add to it a little water or disinfecting solution if you like, and then the rest of the proceedings will resemble very closely what Professor von Schrötter mentioned, that you have to add to it, before disposing of it, a little bran or sawdust or some other material that can be burnt. I can strongly recommend this as being a very simple and effective, and, at the same time, a very cheap method of dealing with the sputa. As regards the ventilation subject which was mentioned by Dr. Robertson, personally I am even more interested in the curative than in the preventive aspect of the question. I notice he was very careful not to commit himself as to what the standard of ventilation should be. Of course, to many of us the evidence of the senses is quite sufficient to determine whether the room is properly ventilated or not, but I am afraid we are very apt to become acclimatised, as it were, to the foul air in an uninhabited room, and not to notice it as we should. I think it is a point of importance to notice that many of the new shops in London, and, I have no doubt, elsewhere, are being built with windows that cannot be opened, and with plate-glass windows without any openings to them. I think that, in this respect, they are a distinct retrogression upon the type of shops which they replace. Of course, if we wish to have proper ventilation in shops we shall have to see to the purification of the air outside. It is hopeless to expect an ordinary shopkeeper to permit his windows or ventilating openings to be freely opened so long as the air that comes in is foul, and smuts and spoils his goods; so that the ventilation of shops is bound up with the question of the purification of the air and the efficient burning of the coal smoke. I would suggest that for preventive purposes and for ordinary purposes the old standard of six parts in 10,000 of total CO_2 may be sufficient. I am not sure that in a very great number of instances the standard of venti-

lation does not come up to this, that is to say, two parts of respiratory CO_2 added to the ordinary proportion in the outside air. I have, however, convinced myself that it is quite possible to provide very much better ventilation in suitably constructed buildings and rooms in the country. With a large air space I have satisfied myself by means of a few experiments with Lunge and Zeckendorff's method, that it is quite possible to purify the air to a standard of at all events something between 4 and 5 parts in 10,000, and that if you have a large outlet opposite to a large inlet, it is possible to bring the purity of the air inside the room very close to that of the air outside. So that for curative purposes I would suggest that the 6 parts in 10,000 is far too lenient. I was unable, in a room in which I experimented, to detect any appreciable difference in the proportion of carbonic acid gas inside the room and outside the room, and yet this particular room had been occupied continuously day and night for several days by a consumptive patient. But in order to do this it is absolutely necessary that you should have ventilation not only from the front but also from the back; that is to say, you must have two opposite sources of communication with the open air in order to produce this purity. It is not sufficient even to have a very large space on the one side. I may cite the open-air galleries at the North London Hospital for Consumption, which are 66 feet long, 12 feet deep, and about 12 feet or more in height. The front consists merely of an open balustrade up to somewhere about *this* height (indicating), and above this an open space which can be closed in, in case of need, by a blind, but it is as a matter of fact pretty permanently open. In this hospital, with a very moderate number of patients, it was noticed on two occasions by the house physician that the air was distinctly stuffy to the senses, to the nose, at the time of an early morning visit. Here is a huge opening on one side, but on this particular occasion there was no opening at the back. I would impress upon everybody, who needs to have it impressed upon them, that one opening is insufficient for curative purposes, that you must have a sufficient opening at the back as well as at the front. Of course, if you have an opening at the back it is necessary to see that this also is in free communication with the outside air. I do not think I need keep you any longer, but I thank you for having listened to my remarks. I suppose that what I have set down in my paper will be published in due course, and may be taken as read. (Applause.)

[See also paper at end of discussion, page 136.]

Dr. Antonio Espina y Capo, *Madrid*: Mr. President and Gentlemen,—In the whole category of this new crusade of civilisation against ignorance, perhaps nothing is so important as this fight against tuberculosis. If one accepts the principle that the destruction of the bacillary germ is the safest means of avoiding the spread of this calamitous disease, much may be done, no matter how modest may be the initial efforts. By training all people to use the spittoon, it is possible in some degree to limit the infection; but the difficulties connected with obtaining these spittoons and with their subsequent

sterilisation induce us to present this report to the British Congress in the hope that it will somewhat expedite the solution of the problem.

There are two parts to this paper. In the first we shall treat of pocket spittoons. In the second, of those that must be placed wherever two persons are congregated.

Pocket Spittoons.—Hygienists and inventors have devised many patterns, and it is impracticable critically to examine them all. Although all embody the great principle of abolishing the bad habit of spitting on the handkerchief, all have the common defect of accumulating the sputum. The disposal of this latter by means of washing in running water, not always at hand, and the fresh risk of carrying the sputum into the street, warrants the conclusion that not one of them fulfils the claims of hygiene and prophylaxis.

Bearing in mind that in the solution of this problem no provision that is not at once cheap, practical, effective and easily obtainable by all, can be a true solution, we venture to propose a remedy which in our opinion fufils, if not all, the greater part of the proposed conditions.

Every one, no matter what may be his social position, knows the simple, economical and clean toilet paper used for the w.c. in all civilised countries. If we extend the use of this paper, employing it as a pocket spittoon, we shall reach the hygienic desideratum.

It will be sufficient if all people use hygienic paper instead of the traditional handkerchief, which we carry permanently in our pocket, dirty with mucus, sweat and saliva. The sputum which it contains transforms the pocket into a veritable microbe centre, in which the bacilli dry and retain their vitality for long periods. The destruction of this hygienic paper is so easy that a match only is necessary to incinerate it, together with the sputum it contains. If, from an hygienic point of view, the "hygienic paper" is better in its economic aspect, it is cheaper than any handkerchief, however low in price. A cheap handkerchief is really the dearest on account of its short life, and when a handkerchief costs more than, say, fifty centimes in the currency of any European country, there is nothing regarding the economic advantage of paper over handkerchiefs.

Moreover, in considering the economic aspect of the question, we must take into account the great number of handkerchiefs we lose, and the great incentive that an expensive mouchoir gives to a thief bent on exploring the contents of our pockets. We must also reckon the three centimes one has to pay (one penny or twopence in England, I believe) for washing and ironing, so that, after all is taken into account, the paper article, especially having in view the total destruction by fire of the sputum, mucus and saliva, is a good investment from an economical point of view.

Another consideration which we must urge on behalf of "hygienic paper" is the difficulty of exchanging the handkerchief when it is dirty, and the necessity of carrying it in that condition—even in the town in which one lives—a sufficient time to infect the pocket. The difficulty increases in offices, chambers, or when on a journey, and even by carrying several we do not get over it, since the dirty ones must remain in the pocket with their attendant inconvenience.

The chief advantages of the paper are its cheapness, ease of destruction, and aseptic cleanliness of the pocket and nails, which, in the case of the handkerchief are infected at the moment of taking it between the hands. But, if in common use it is essentially clean and hygienic, its employment in cases of tuberculosis is of inestimable hygienic value, because in analysing the various products found on dirty handkerchiefs, one encounters all kinds of microbes, including the bacillus of Koch, which, as is well known, preserves its pathogenic conditions notwithstanding the washing and drying processes, since it requires special means, to which a handkerchief is never subjected, to destroy it.

Finally, I will briefly refer to the use of the handkerchief by tuberculous patients in the advanced stages of the disease. All of us have seen these unhappy victims surrounded by their relatives and friends, and the solicitude which the latter display in assisting expectoration: putting before their mouths a handkerchief, sometimes that of the patient, but sometimes their own, wiping the sweat from the face and hands, and passing the dirty and infected article from one to another. How much cleaner is it for any one to use a piece of paper, if necessary, afterwards, impregnated with petroleum or alcohol, and immediately burnt.

So much, then, with regard to portable spittoons: it is hardly necessary to point out that these arguments are equally strong with regard to spittoons placed in houses or in public places. They should also be constructed of a substance easily destructible by fire, and of a material sufficiently cheap to admit of their being replaced every day.

The excessive price of the apparatus necessary to properly disinfect the spittoons at present in use, the upkeep of the same, and the necessity of employing a steam engine and machinist, together with the danger to which the latter is exposed, from infection and from poisons by the sublimate, are strong arguments against their use. Moreover, the danger that domestic animals may become infected by the contents of the spittoons cannot be overlooked. These reasons induce us to recommend in place of the expensive and unnecessarily strong spittoons at present in use those constructed of lighter, cheaper and easily combustible materials. For their destruction a small domestic stove is sufficient, whereas in a hospital or sanatorium a crematory is cheap besides being easy of manipulation.

The idea itself will awaken in the field of industry the means of carrying it into effect, and to appreciate how easy is its realisation one has only to call to mind the useless articles which are offered us by advertisement from day to day. By suggesting an appropriate pattern, as for example the boxes in which cakes are sent out, every industry connected with compressed paper, liminated wood, celluloid, or even metals of a friable nature, will compete in producing what is required. Trivial as this subject may seem, there appears to us to be so much to be done in the way of prevention of tuberculosis that we believe it worthy of being brought to the notice of this Congress; and, in conclusion, while thanking you for your kind indulgence, I beg to recommend that:—

1. In place of spittoons or handkerchiefs "hygienic paper" should always be employed for the reception of saliva, the paper to be immediately burnt.

2. Collecting spittoons, which must be placed everywhere, should be constructed of a material easily destructible by fire, so that they may be replaced from day to day.

Mr. GARLAND (*General Post Office*): Mr. President, Ladies and Gentlemen,—I must apologise for a certain temerity in intervening in this debate and addressing an expert audience. But the very nature of the matter I wish to draw attention to precludes to some extent its treatment by expert persons. I am advised that it would be unwise to introduce any statistical comparison into this discussion, and such a comparison is not essential to my purpose. It will suffice that the reasons which exist for preventive measures among any class of the populace exist also among the members of the postal staff of Great Britain. In the prevention of tubercular disease, the Postal Department offers an ideal field in which to operate. The Postmaster-General has given an admirable description of his staff. "The Post Office population," he says, "is distributed unequally among different ages and between both sexes, excluding the very young and very old. It consists of selected lives, candidates being required to pass a medical examination before they are admitted to the public service, and the nature of the work varies from duties of a light and pleasant nature to some which involve strain, exposure, and break of rest." Such a staff, numbering 160,000, offers a wonderful opportunity, not only of prevention, but also of watching the results of preventive measures. The education of so large a number of intelligent men and women in the ways of contagion and prevention would go far to spread such knowledge abroad, and diffuse a better understanding of the nature of tuberculosis among the British public. It is needless to argue here that in such an enlightenment of the people lies one of the main roads to success in prevention. I will not dwell on the facilities which exist for such measures in a department organised and controlled like the Post Office. In addition, it is surely the duty of the State to lead the way in adopting preventive measures, and thus, by force of example, to induce other large employers to adopt like measures. Yet it is safe to affirm that some of the most elementary measures for the prevention of tuberculosis have not yet entered into the methods of the British Post Office. In the General Post Office itself, it would be difficult, if not impossible, to find a single spittoon or a publicly exhibited prohibition against expectoration. Speaking from personal observation, I can say that even known consumptives openly and freely expectorate in all parts of the galleries where the minor establishment works. No efficient method of dealing with dust exists. It is allowed to accumulate on the walls and apparatus desks, and to remain for months and even years. The buildings of the Postal Department require disinfection and a more effective cleansing organisation.

As it is always necessary to find a starting-place for preventive measures, I submit that the Postal Department would be an excellent field in which to commence. And I hope that the resolution on this matter to be submitted to the Section will contain some recommendation to this effect.

A most important series of measures has recently been adopted in the French Post Office for the same end, and possibly some French delegate will be able to give us up-to-date details on the question. Acting on the advice of Dr. Mignot, M. Millerand has issued certain decrees and instructions which would form an excellent model to our native postal authorities. These decrees provide for the careful examination and elimination of all tuberculous candidates for employment, and for the treatment in departmental sanatoria of all those suffering from the disease. A medical commission inspects all plans for new buildings or alterations in old ones, and very adequate measures are directed for the cleansing of walls, floors, ceilings, and desks by damp cloths in place of brooms. Conical spittoons containing a disinfecting fluid are placed in convenient positions, and, last but not least, a very striking notice has been issued for the instruction of the staff. This notice reads as follows:—

Notice Concerning the Propagation of Tuberculosis.

Tuberculosis kills in Paris alone over 13,000 persons every year. In provincial towns and country districts it is far more rare.

Nevertheless, it is known that it is caused entirely by contagion; all the modes of contagion are known, therefore it is preventible.

In nearly every case the propagation occurs in the following manner:—

A tuberculous subject spits on the floor, and the sputum dries. The microbes of tuberculosis are to be found in the sputum in myriads, and when dry can remain alive for many years, always ready to germinate like a seed.

They mix with the dust of the air, and, if this dust is drawn in during respiration, the microbes penetrate into the lungs, develop there, and produce the disease.

No age or constitution is secure from these attacks.

It is, therefore, in the interest of all to watch over the observance of the following precautions:—

1. *It is strictly forbidden to spit on the floor in the buildings of the Post and Telegraph Department.*

2. *Dry sweeping is prohibited. The floors must be cleaned with damp cloths.*

Such measures as these reflect great credit on the French postal administration, and I trust that some similar steps will commend themselves to the English authorities.

Dr. VOLCKMAR, *Norway*: Mr. President, Ladies and Gentlemen,—I thought it would be of interest for the Congress here to know that this combustible spitting-pot has been adopted in the hospitals, sanatoria, private houses, and by private physicians in Norway. It is constructed on the same principle as the one that Professor von Schrötter explained here an hour ago. I thought I should have the honour of introducing something new, but I am one hour too late. The only difference is in the outer casing. I have placed

the pot in an outer casing that can be made of any kind of material—zinc, aluminium, or anything that suits the taste. I think it is one of the weapons —small, perhaps—that might be useful in our fight for preventing tuberculosis from spreading, remembering that sometimes small means obtain great results. (Cheers.)

Professor CARLO RUATA, *University of Perugia:* Mr. President, Ladies and Gentlemen,—I wish to make a few remarks on the papers that have been laid before us for discussion. I will only mention one point, viz., the housing question. Every care has been taken for the destruction of the bacillus. I must confess —perhaps I am wrong—that I do not fear it very much. I do not fear it, because when the ventilation is perfect it is very difficult for the bacillus of tuberculosis to obtain lodgment in our lungs. Perhaps there are bacilli in our nails, and we observe the bacillus here or elsewhere, and we have lupus because we have broken the line of difference of our body. If we breathe badly we have broken the difference in our bronchi, and then the bacillus of tuberculosis can be implanted; but, if the ways of breathing are healthy, I do not very much fear the bacillus of tuberculosis. Many experiments were made; perhaps the first were those of my *confrère* Dr. Strauss, of Paris. He saw that all medical men, nurses, and nursing people in hospitals breathed the bacillus of tuberculosis, and that they caught phthisis very seldom. If the bacillus of tuberculosis was feared as much as is the general concurrent opinion, we medical men should have died of tuberculosis. I would insist upon another point. It is difficult to exterminate this bacillus, but we must do another thing to preserve in good condition the ground where it is implanted. For instance, you have a splendid building. I remember that a few days ago in my own country I entered a big room on a railway—the ticket-room. There was a bad smell; the windows were not open. The room was excellent, but that is not sufficient. The dwelling-house was perfect, but that was not sufficient; the windows were shut. When you breathe such a bad air you put inside yourself some irritating substance in your lungs, and this irritating substance paralyses the action of the bronchial organ of the epithelium. As a first effect you always have in the morning a little cough. When I enter the houses of the poor people where I practise, and when I see, for instance, three or four people sleeping in a room, I am filled with sympathy for the suffering I see. These people are not only pale, but, when they get up, the first thing they do is to cough. It is because of the irritation of all these bad things. No one can say what it is, because it never was analysed. It produces a congestion of the lungs which terminates in a cough. If, in these cases, the bacillus of tuberculosis is introduced, certainly it finds an excellent ground, and will catch. But, when a man sleeps with windows open, he gets up in the morning quite well; his bronchi are in excellent condition, and it is difficult for the man to catch tuberculosis.

Then I would insist not only on proper housing, but on instruction in the houses in order that the houses may be well kept. For instance, I have seen here in England something very different from what I saw constantly in

Italy. You go into the country, and, thanks to the great efforts made for half a century, or even more, by Sir Edwin Chadwick, very little country houses are splendid buildings compared with the country houses in my country. Although in Italy the houses are so bad, tuberculosis is no more common there. On the other hand, tuberculosis is more frequent where buildings are good. That is an extraordinary assertion, but I will give you a few facts to prove it. I am well acquainted with the statistics of Italy, which are published in a very excellent form. In the upper part of Italy, in Lombardy and Venice, tuberculosis is tolerably frequent. It is frequent in this sense. In the big towns, including even Milan and Venice, the tuberculosis is quite double that in other towns. For instance, in the province of Milan, which has 1,200,000 inhabitants, the death rate from tuberculosis is 32 per 10,000. But if we take out the town of Milan, and only take the little villages which constitute the remnant of the province, the death rate is only 14 per 10,000, so that the death rate in Milan itself is more than double. The province of Florence has a death rate from tuberculosis of 28 in every 10,000 inhabitants. If we take out the capital, and consider the death rate of the remainder of the province, the death rate is only 13 in every 10,000 of the inhabitants. That is very instructive, because we know that in big towns the buildings are by far better than those in the little villages. It is a singular fact that tuberculosis is worse where better houses are, while it is less where bad houses are. It is caused by this—that in big towns there is no breathing space. The people have to breathe the air of the town, while in the country the people are always out in the open. It is not a gratuitous assertion that I make, because I can show figures to prove it. In the upper part of Italy, including Tuscany, the death rate from tuberculosis is about 22 or 23 in every 10,000 inhabitants. Coming down to the Neapolitan in Sicily, the death rate from tuberculosis is far less. In the province of Palermo it is 10 in every 10,000 inhabitants; in Catania, another province of Sicily, it is only 9 per 10,000 of the inhabitants, while the remainder of Sicily has only a very low death rate, and yet these provinces are the dirtiest. But these people live continually in the open air, because the climate is exceedingly mild, and, living in the open air, they do not mind much living in bad buildings. That is another proof that in Italy the worst mortality does not occur where there are bad buildings. The conclusion is this—that we medical men, before asking the non-medical men, the legislative power, to incur a big expenditure, must try to preserve our lungs as we preserve our skins. I think we should give the most detailed instructions to our patients to breathe well, and particularly to breathe well during the night, because during the day we go out and in; but during the night we spend eight or nine hours in the same room. Therefore it is necessary that during the night we should breathe well,

DISCUSSION ON HIGHER STANDARD OF LIGHTING AND VENTILATION.

Dr. GLOVER LYON, *Physician to the City of London Hospital for Diseases of the Chest, Victoria Park, London.* (Abstract of Paper.)

CAUSES OF CONSUMPTION.

(1) *Heredity.* (2) *Habits.* (3) *Infection.*

AIR supply relates chiefly to habits or conditions of life. Bad air causes deterioration of health, leading to increased susceptibility to phthisis, and in extreme cases seems to act specifically in this direction. The respiratory apparatus of the body capable of temporary adaptations. Pure air required occasionally. Vitiated air tolerated for a short time without injurious effect. Great variation in tolerating powers of individuals. Brain work necessitates better air supply than manual labour.

DEFINITIONS.

Pure air.—Such air as may be breathed by most people all through the year without deterioration in health.

Fresh air.—Such as will serve continuously for some time but not indefinitely.

Vitiated air.—Such as can be breathed without injurious effect for short periods only of the day.

Pure air not necessary to prevent or even cure phthisis. Results at London Chest Hospitals. Effects of prolonged exposure to vitiated air. Overcrowding and under-ventilation.

SUBJECT OF SUPPLY.

(1) General air supply of the towns, including the supply to streets.
(2) Air supply to individual buildings.
(3) Ventilation of buildings and rooms.

(1) GENERAL AND STREET SUPPLY.

When Queen Victoria came to the throne, the general supply of air to London was perfectly good, and country air could be enjoyed within an easy journey on foot by all Londoners.

At the beginning of Edward the Seventh's reign, pure air is unattainable by the majority of His Majesty's subjects dwelling in his capital. Provision of much larger spaces, within easy reach of all, imperative.

Zones of houses built next to open country blocked in by others one after another.

For every house built, or rebuilt, adequate park space in near proximity

to it should be provided. Natural forces with adequate open spaces sufficient to provide good air for suburbs. Forced draughts of air suggested by Sir William Preece possibly necessary for the central part of London. New York and London compared as to open spaces. Abatement of smoke, etc. Cleansing of streets. Locomotion.

Air Supply to Individual Buildings.

Present regulations quite inadequate. Many modern mansions practically collections of back-to-back houses with less air supplied to them than prisons and workhouses. This is an increasing evil. Use of fans would do much to mitigate this.

Ventilation of Buildings and Rooms.

The ventilation of buildings not now in the hands of medical officers. No supervision of any account. Large buildings should be split up into proper ventilating units. At present the lower parts foul the air of the upper parts, and the windward side fouls the leeward. Fans here again useful. Present regulations for ventilation of rooms, etc., relate only to floor space, air space and area of openings. Rules necessary as to quantity of air supplied, also as to proper distribution of inlets and outlets. Through ventilation the only efficient method. Theatres, schools, churches, and public assembly rooms. The author's method.

Ways and Means.

The means now at disposal of public bodies inadequate. All parts of London will come ultimately into the hands of the freeholders. Occupiers or leaseholders for the moment enjoy even permanent improvements. When public loans are raised to effect permanent improvements the interest should be paid by leaseholders and the sinking fund provided by freeholders. There should be fines analogous to death dues upon the granting and renewal of leases and upon rebuildings. By this means the resources of local bodies would be largely increased.

Suggestions.

(1) That regulations should be drawn up for the adequate provision of open spaces in the building and rebuilding of large cities.

(2) That in the case of schools and public assembly rooms of all kinds, provision should be made to admit a standard quantity of fresh air to each person the schools or assembly rooms are intended to accommodate.

(3) That ventilation generally should be under the supervision of the medical officer of health.

OVERCROWDING AND TUBERCULOSIS

By FREDERIC C. COLEY, M.D.,

Physician to the Northern Counties Hospital for Consumption and Diseases of the Chest, etc., etc.

It will be generally admitted that overcrowding in ill-ventilated and unsanitary dwellings constitutes the crux of the difficulty in the way of the prevention of tuberculosis. If this were thoroughly amended, all the other necessary reforms would be comparatively easily secured, or would sink into practical insignificance.

As regards London, there are no doubt special difficulties, owing to the immense area of the overcrowded districts. But in almost all other places it is simply a question of money. If working people are able and willing to pay a sufficient rent, they can readily secure healthy and sufficiently roomy dwellings.

Mr. Rowntree's statistics show that *the average expenditure per family among working people* upon excisable liquors is six shillings per week. My own personal observation (though I could not give statistics) leads me to the conviction that this is a moderate estimate.

In the city where I live (Newcastle) this sum would be sufficient to pay for a healthy and suitable dwelling for a working-man's family.

A very large proportion of the inhabitants of "slums" are now earning wages which would be sufficient to enable them to pay the rent of commodious dwellings in healthy parts of the city. Their expenditure upon drink is the only thing which prevents them from leaving the slums. Another large proportion, whose wages are at present small, would be able to earn more than sufficient for that purpose, if they did not waste time and strength by excessive drinking.

If these two classes were eliminated from the slum population, such a very small proportion would be left that the demand for unsanitary tenements would be too small to make property of that kind remunerative; and the problem of providing for the small residuum of poor whose poverty was not due to drink would become an entirely manageable one.

It follows from all this that the problem of overcrowding is, for practical purposes, simply one phase of the drink question.

And as overcrowding is the main difficulty in the way of the prevention of tuberculosis, it is clear that nothing would have a more important influence in aiding the success of our crusade against phthisis than the general adoption by the working classes of the practice of abstinence from alcohol.

The practical corollary is sufficiently obvious, viz., that medical men should use their influence, among working people especially, in favour of total abstinence; and should be careful to avoid breaking down habits of abstinence by the needless prescription of alcohol, especially in the form of ordinary alcoholic beverages.

THE NEED OF A STANDARD OF EFFICIENT VENTILATION IN ALL WORK-PLACES AND PLACES OF PUBLIC ASSEMBLY.

By Dr. ARTHUR RANSOME, F.R.S., etc.

It is now universally acknowledged that the breathing of atmospheres laden with organic impurity, especially when this comes from respiratory sources, is closely associated with the spread of tubercular diseases of the lungs.

The evidence in support of this proposition is now overwhelming. The prevalence of phthisis on badly drained or impervious soils, in densely populated neighbourhoods, in ill-ventilated workshops, dwellings, barracks, prisons, etc.; its origin in certain tubercle-infected houses or areas, in dusty, crowded, inefficiently ventilated places of public assembly—all these circumstances tend to increase the death-rate from consumption, and they are all more or less connected with the one factor, the presence of air polluted with organic matter.

It is probable that the incidence of consumption upon communities living under one or another of the above-mentioned conditions is due to more than one influence :—

(1.) First and chief, we have in such places a greater probability that tubercle bacilli are present in the floating dust of the air.

(2.) In such places also the bacillus retains its virulence for much longer periods of time than in comparatively pure air.

(3.) In foul air these organisms are usually accompanied by numerous other pathogenic germs, whose office it is to make the entrance of the specific microbe more ready and easy.

(4.) Add to these favouring facts the probability that the inhabitants of such localities are, for the most part, the very poorest, the worst nourished, and the least careful members of the population; and

(5.) The extreme likelihood (though this is not yet proved) that persons exposed for long periods of time to these adverse conditions are less able to resist the attack of the enemy when it succeeds in obtaining an entrance.

Whatever may be the explanation of the facts, it is obvious that one of the first duties of those who are organising the "campaign against phthisis" must be to get rid of these conditions so favourable to the disease, in other words, to sweep away the "air sewage" wheresoever this may be found.

Hitherto local sanitary authorities have turned their attention chiefly to the disposal of water sewage; but, when the account is fairly made out, it will be found that impurities in the air have exacted from communities a far heavier death-toll than have imperfections of drainage and water supply. Compare, for instance, the steady, relentless slaughter of more than half a million persons every decade with the occasional epidemic death-rates from cholera or enteric fever. The worst mortality from these two diseases, in any one decade, never equalled this terrible mortality; a mortality which is constantly going on.

The only means of keeping the air of crowded places free from a dangerous degree of impurity is that of sweeping it away constantly by currents of pure air, in other words, by copious "ventilation."

For dwelling rooms the standard of efficient ventilation has been fixed by the masters of public health at 3,000 cubic feet per head per hour.

This standard depended originally upon an observation of the late Dr. R. Angus Smith, to the effect that the smell of organic impurity in the air begins to be perceptible when the CO_2 of respiratory origin reaches 4 parts per 10,000, that is, if the outer air contains also 4 parts when the total amount of CO_2 reaches 8 parts per 10,000. He also noticed that when this limit was reached such air often caused headache and general *malaise.*

Practical observations have confirmed this general statement; notably those of Wilson, who showed that, in certain cells of the Portsmouth Convict Prison, of 614 cubic feet always occupied, the CO_2 equalled 0·720 per 1,000, and the prisoners remained healthy and of good colour. In cells of 210 cubic feet, occupied only at night by prisoners employed outside during the day, he found 1·044 per 1,000 of CO_2; the occupants were all pale and anæmic.

For safety's sake the permissible amount of respiratory CO_2 has been fixed at half the amount ascertained to be noxious, namely, at 2 parts per 10,000, and, seeing that about 0·6 of a cubic foot of CO_2 are exhaled, on the average, by human beings per head per hour, it is obvious that, to dilute this down to 0·2 parts per 1,000 cubic feet, 3,000 cubic feet per head must be admitted to a living room every hour.

It will be noted that in this calculation it has been taken for granted that the proportion of CO_2 is also a measure of the organic impurity in the air, but a little consideration will soon show that this cannot be always the case, for CO_2, as a gas, is rapidly diffusible; whilst the organic matter is particulate, and can thus only be swept away by sufficiently strong currents of wind.

Notwithstanding this fact the proportion of CO_2 may be taken as a very fair criterion of the efficiency of ventilation. Although, in stagnant air, the CO_2 may diffuse away and the organic impurity be left, by ventilation both of them are swept away together, and thus the CO_2 becomes a very fair standard for purposes of comparison between a good and bad system of ventilation.

In their inquiry into the ventilation of schools, Carnelly, Haldane and Anderson found a general relationship between the CO_2 and the organic impurity, so that a high carbon dioxide is, as a rule, accompanied by a high organic matter, and *vice versâ.*

In a Home Office inquiry into the circumstances of humidified cotton-weaving sheds, in which I took part, along with Sir H. Roscoe and the late Sir W. Roberts, we found that the amount of ventilation required by statute in these places was insufficient, "and we recommended that, as a measure of the respiratory impurity, no greater proportion than nine-tenths of a volume of CO_2 per 1,000 volumes of air should be contained in the air of the sheds, and that the ventilating arrangements should be sufficient to secure the general attainment of this standard."

They said, "In fixing this standard, your Committee are aware that from a medical point of view this proportion may be considered too high. They have, however, suggested this limit, believing that, if effectually carried out, a very great improvement in the air of the sheds will be brought about, without laying any serious burden on the trade, and, in fact, without asking for more to be done than is now actually carried out voluntarily in well-regulated sheds. This limit will secure an amount of ventilation corresponding to about 2,000 cubic feet per head per hour, and your Committee believe that such a requirement would bring about a material improvement in the health and comfort of the workers."

The proposal was accepted without opposition by both masters and work-people; and in the ensuing session of Parliament it was embodied, together with other suggestions, in the Cotton Cloth Factories Act of 1897.

Sufficient time has not yet elapsed since the passing of this Act to enable us to judge of its results; but already, in his Report to the Chief Inspector, in 1899, Mr. Williams, the Inspector under the Cotton Cloth Factories Acts, remarked that the scientific test "has already led to a great improvement in the working conditions of many thousands of operatives, and it has also done much to promote an intelligent interest and a more exact knowledge on the subject of ventilation."

He also gives a statement showing the results of tests made of samples of air taken from the middle of sheds before and after the improved means of ventilation were installed. These results are shown in the table on next page.*

From this table it will be seen that, owing to the improvement in the systems of ventilation introduced by the manufacturers, the amount of respiratory impurity has, in most cases, been diminished by one-half, and in some it is only one-quarter of what it was before the passing of the Act.

In a private letter, Mr. Williams tells me that he has ascertained from several managers of these reformed sheds that the health of the operatives has been greatly improved, and that the sickness rate is much smaller than before the improvements.

When we consider the full meaning of these facts, it becomes the duty of all who are concerned with the health of our British workpeople, who are the "backbone" of the country, to see that the great benefits of the ventilation of all "work-places" should be secured to them as soon as possible.

The beneficial influence of the Cotton Factories Act of 1897 is at present only extended to the workers in "humidified cotton-weaving factories"—to not more than about one hundred thousand male and female operatives; but

* In his Report for 1900, Mr. Williams gives a more extended table, and also figures relating to the CO_2 in cotton-spinning mills, which show that where there are no mechanical means of ventilation, the quantity of carbonic acid per 10,000 of air usually exceeds twenty volumes—an appalling amount, which must lead to ill-health.

In a further Report (1901) Mr. Williams gives analyses in 43 humidified sheds, showing an average of only 3·7 of CO_2 per 10,000 volumes of air. He states that "there can be little doubt that the effect has been very beneficial." (Report of Chief Inspector, p. 198.)

TABLE SHOWING RESULTS OF ANALYSES OF SAMPLES OF AIR TAKEN RESPECTIVELY BEFORE AND AFTER IMPROVEMENT OF VENTILATING ARRANGEMENTS IN CERTAIN COTTON-WEAVING SHEDS.

Number of Comparison.	Number of Volumes of CO_2 per 10,000 Volumes of Air.		Approximate Number of Volumes of CO_2 per 10,000, due to Respiration.	
	Before Improvement.	After.	Before Improvement.	After.
(1)	12·0	7·1	8·0	3·1
(2)	10·8	8·2	6·8	4·2
(3)	14·7	7·1	10·7	3·1
(4)	15·3	6·6	11·3	2·6
(5)	10·9	7·0	6·9	3·0
(6)	13·0	8·2	9·0	4·2
(7)	13·2	7·8	9·2	3·8
(8)	15·4	7·6	11·4	3·6
(9)	11·7	6·4	7·7	2·4
(10)	14·4	7·7	10·4	3·7
(11)	11·3	6·4	7·3	2·4

The approximate number of Volumes of CO_2 per 10,000 ascribed to Respiration, given in the two last columns, are obtained by simply subtracting 4 (the usual normal amount of CO_2) from the two preceding columns.

there are some millions of others who are now left to perform their arduous labour under the old conditions of insufficient air-supply.

There can be no doubt that if the same standard of ventilation were applied to all work-places, the health of the people who work in them would be benefited to at least the same extent, and that the prevalence of consumption amongst them would be reduced greatly.

Not only would these workers breathe purer air during their labour, and thus avoid the danger of infection during their work, but they would be taught the invigorating power of fresh air, and would find themselves unable to tolerate the close and polluted atmospheres of their own homes. They would learn to keep open their windows at night as well as in the day, and would thus escape the bugbear of "catching cold," which is now such a fertile source of many forms of ill-health.

Lastly, I would put in a plea for some regulation of the ventilation of all places of public assembly—theatres, concert-rooms, churches, chapels, and rooms in which public meetings are held. There can be little doubt that consumption is kept up to its present high mark by the tuberculous dust which now circulates in the air-sewage of these places; and it is high time that steps were taken to rid ourselves of this opprobrium.

I am aware that the chief objections that will be made to these propositions will be on the score of the expense of carrying them out.

Not only will some people deprecate putting manufacturers to the additional charges involved, but, if the methods employed are made the subject of Government inspection, the cost of payment of qualified inspectors will be a serious item in the balance-sheet of the nation.

I would not make light of either of these difficulties; but as regards the first, I would point out that, when the employers of labour realise the gain accruing through the better health of their workpeople, and when the operatives find out the improvement in health and efficiency due to better ventilation, both parties will voluntarily accept the improved conditions of labour; and we may fairly hope that the trades unions will help on the beneficent work.

In this case there will be little need of additional inspectors, and thus one of the most important objections will fall to the ground.

The more difficult problem of securing better ventilation in places of public assembly, and, still more important, in shops and in the offices where many clerks are employed, must be left to the outside pressure of public opinion; but when the great danger of infection existing in these places is made fully manifest to the minds of those who are involved in its meshes, there will arise a cry for protection against the risk which the keepers of these centres of infection will no longer be able to resist, and there will be a general demand for their better ventilation.

I venture, therefore, to propose the following resolution:—

> "That the Council of the National Association for the Prevention of Tuberculosis be requested to impress upon all employers of labour, and upon the managers of all places of public assembly, the danger of polluted atmospheres, and the urgent need of efficient ventilation."

Dr. WHITESIDE HIME, *Bradford*: Mr. President, Ladies and Gentlemen,—I have much pleasure in seconding the resolution.

Mr. C. H. GARLAND, *General Post Office:* Mr. President, Ladies and Gentlemen,—Before that is passed, might I make a suggestion. We have been discussing this morning the question of ventilation, particularly in regard to dwellings, and no practical suggestions have been made in that direction. Even if such practical suggestions were made and were carried out by owners of property, there is still a very large work to do in educating the people as to what is required for proper ventilation. I have known many cases where proper facilities have been provided, and the ventilating portion of the windows has been stopped up by those who occupy the houses. What I wish to suggest is this. This opens up a wide field for school boards to educate the children from their very earliest days as to the desirability of proper ventilation in houses. The resolution that is now proposed is one which can evoke no opposition whatever, but still it appears to me to lack practical suggestion, and I should be glad if something could be added as a suggestion to school boards to add to the school curriculum the education of children in regard to ventilation.

Sir HENRY LITTLEJOHN, *Edinburgh:* I cannot but think that this resolution does not go far enough. You are appealing in a general way to employers

of labour, but I think that we ought to appeal to municipalities, so that we can strengthen the hands of the medical officers of health, who are doing all that they can in order to prevent this overcrowding. I have no hesitation in saying that the proposition ought to be altered to include municipalities, and not refer to the employers of labour, and other men, who pay not the slightest attention to anything that this Congress does. We can appeal directly to municipalities who are represented here, so that we can strengthen the hands of the medical officers of health in dealing with this important question.

Dr. JOHN SYKES, *London:* I want to ask a question. Is there any reason why you should not deal with both municipalities and employers of labour?

Councillor WENDLEY, *Leicester:* I should like to know whether some practical suggestion could not be made. We are all of one mind as to the necessity of ventilating buildings, factories, and other places. The only question is how that ventilation is to be carried out. It is no use going into vague generalities on this point. We recommend that the municipality should have power to ventilate, and recommend architects to ventilate, but they do not do it. If they do it in factories or warehouses, as a rule the workmen complain of draughts and close the ventilation. Unless some practical suggestion can be made we are simply indulging in platitudes and pious opinions.

The CHAIRMAN: No amendment has been moved, and I will therefore put the motion to the Section.

The resolution was then put, and declared carried by a large majority.

A DELEGATE: Was Sir Henry Littlejohn's resolution carried, or the first resolution?

The PRESIDENT: I did not understand Sir Henry Littlejohn to move any specific amendment.

Sir HENRY LITTLEJOHN: I had hoped that our worthy Secretary would have so amended the proposal before the meeting that it would not have been necessary for me to divide this audience. I think that possibly by a slight addition to the proposal before the meeting unanimity may be gained, just as it was gained yesterday.

The PRESIDENT: There is only one method known to me of conducting the business of an assembly like this, and that is when a resolution is moved to put it to the meeting, and, unless a specific amendment is moved to it, of course the resolution passes. That has been the case on this occasion.

Professor CARLO RUATA, *Perugia:* There are two things to be taken

into consideration, firstly, that Dr. Ransome proposes a resolution and then Sir Henry Littlejohn. I think if those resolutions were put together we should approve. (Order, order.)

The PRESIDENT: I am afraid I cannot admit any discussion on my ruling.

Dr. JOHN SYKES, *London:* Mr. President, Ladies and Gentlemen,—Like Dr. Ransome, I have always a feeling that most of these congresses end in pious opinions. The value of them is something or nothing, according to whether they are acted upon or not. Now I lay some stress upon that view, because the attitude I want to assume is that of the executive officer, who has to carry out the opinions of experts, and where the whole trouble arises with the executive officer is that he is not given the power. I feel that in a meeting of experts the one thing that ought to be done is to express a very definite and decided opinion, because if those experts come and spend their time and do not arrive at any opinions, they might equally as well have stopped at home and considered the matter there. (Hear, hear.) Therefore there ought to be some sort of definite resolution, and I wish, with the permission of the meeting, to move three definite resolutions with regard to dwelling-rooms, so that I shall not clash in any way with Dr. Ransome's resolution, or with any resolution which I understand Dr. Robertson probably may also propose. The usual result of passing a pious opinion is this. It goes to a superior body, it may be the Local Government Board, the Home Office, or the council of an association, or something of that kind, and it generally gets translated in law into "adequate this" or "sufficient that," which is not to the satisfaction of a particular individual. I should not object to those resolutions if they were formed to the satisfaction of the medical officer of health, or to the satisfaction of the sanitary authority, or of some authority that might express satisfaction, but they are not so framed. Nearly all our laws and bye-laws contain the words "adequate or sufficient," and the person who decides the adequacy or the sufficiency is the magistrate. Now the magistrate has no training whatever in that kind of work, and, unfortunately, in nine cases out of ten, he has a doubt simply because he is not trained in that way, and he very properly says, "If I have a doubt, I give the defendant the benefit of it." The result is that in ninety-nine cases out of one hundred the defendant always gets the benefit of the doubt, simply because the magistrate possesses a doubt. So much for that aspect of the point; but what I want to insist upon is this—that at this Congress the very excellent papers which have been distributed, the excellent illustrations and diagrams in the museum, have shown us three or four definite things. Mr. Shirley Murphy's diagrams, and Sir Hugh Beevor's diagrams and tables, have shown very distinctly that the indoor worker has phthisis more often than the outdoor worker—at least, that is not shown in the diagrams, but they show that the incidence of tuberculosis is greatest in the narrow streets. The most cramped dwellings and the most crowded rooms with bad light and air are the

most potent factors. With regard to cure and prevention, while one is naturally pressing forward the open-air treatment for cure, one ought to press forward still more the open-air treatment for prevention—(Hear, hear)—and it therefore follows that we want a standard of space and various other points connected with light and air. I will give you some illustrations of how we suffer executively. There is no definition of overcrowding in our English law. I do not know whether there is such a definition in any law on the Continent, but there is no definition here. We are perpetually talking of overcrowding, and this is the kind of thing that happens. The census return is taken; the Registrar-General publishes statistics. There is a great hullaballoo about the number of people that are crowded into rooms. It is then said, "How is it that the sanitary authorities, the sanitary inspectors, and the medical officers of health did not find it out?" There are very good reasons. In the first place, there is no definition of overcrowding, and the only place in which you see any sort of definition is in the bye-laws relating to particular houses which have been registered. There is, therefore, no definition of a minimum cubic space except in these particular bye-laws. The point of the whole thing is that in those bye-laws the unfortunate officers who have to carry them out have practically four classes of individuals to deal with—children, adult males, females, and married couples. They are all treated differently. Then there is another condition, as to whether the room is used for sleeping or living and sleeping purposes, as to whether it is used for working purposes, and so it goes on. Confining myself purely to dwellings and working places, you have a series of standards which cross one another in the most inconvenient manner, and the poor unfortunate inspector is at a loss to know whether the place is legally overcrowded or not. In my opinion we want all that swept away, and something very definite and clear stated. We want a clear definition that below a certain minimum standard it shall be a nuisance for the person to have less than a certain amount of space as dwelling-room. I do not mind what standard you adopt as long as it is a definite standard. Then there is no definition of square space in our law. If you regulate the minimum height of your rooms, the square space will adjust itself. Then there is no definition of window space, whether glazed or unglazed, except in cellar dwellings—that is to say, dwellings that are more or less underground. It is impossible to deal with workshops and dwellings together. I think you will see that at once, for this reason. You must have your dwelling well constructed, or you cannot have it properly used. It means one long continuous control to keep the dwelling in proper usage, or, what is better still, proper education of the inmates; but the first thing you must supply them with is the means of using the place in such a manner as to obtain health. Having done that, you can punish them if they do not make use of it. In workshops there is a different condition of things. There is a responsible, substantial employer who keeps the place continually under his supervision, and you have a man that you can always fix with the responsibility to carry out what the law requires. Therefore the conditions of executive work in a workshop and the conditions in a dwelling-house or

dwelling-room are very different, the one being under the constant supervision of the employer, the other being in the hands of a family that we may more or less educate. I wish to move these resolutions: "That in the opinion of this section of the Congress, the following conditions of dwelling-rooms should be dealt with as nuisances: (*a*) Any dwelling-room used for sleeping so overcrowded as to be injurious or dangerous to the health of the inmates, whether or not members of the same family—that is to say, in which each inmate over ten years of age is provided with less than 400 cubic feet of air space, and each inmate under ten years of age with less than half this amount." I may say that that is the present bye-law for houses let in lodgings as applied to one-room dwellings. The only difference is this—the word "overcrowding" is defined there in exactly the same way as it is in the Public Health Act, but with this difference—that the words in the Act are "house or part of a house," and I have used the words "dwelling-room," so as to be specific and to know what we are dealing with. The second condition is: "(*b*) Any dwelling-room less than seven feet high throughout the whole area, and any dwelling-room in a roof less than seven feet high throughout less than half of the whole area." That is on account of the Building Acts, and will fit them exactly. The third condition is: "(*c*) Any dwelling-room not having one or more windows opening directly into the external air, with a total area clear of the sash-frames equal to at least one-tenth of the floor area of the room, and so constructed that one-half at least of each window of the room can be opened, and the opening in each case extends to the top of the window." Those words are exactly reproduced from the existing law with regard to underground dwellings. In those resolutions there is nothing but what exists already in our law. I am not asking you to pass anything new; all I am asking you to do is to give executive officers the power of putting that law into force which I say at the present moment is most inadequate. If you will do that, and make these actual infringements of existing laws nuisances that can be dealt with summarily, we may be able to do some good; but until the law is made in such a way that you can exercise that power in a proper manner without being defeated with all sorts of technicalities all along the line, I venture to say that it is mere waste of time to talk and pass pious resolutions. (Cheers.)

Mr. HALL, *London:* Might I ask Dr. Sykes whether he proposes that this resolution shall apply to all existing buildings, or only to new buildings?

Dr. SYKES: I thought I had made it clear that this is a question of dealing with nuisances, and that it does not interfere with new buildings at all. The resolution deals with a roof of less than a certain height. If you like to make it six feet six inches, six feet, or even five feet, I have no objection; but I want a minimum height, in order that we may say, "Below that point it is a nuisance, and must be abated."

Mr. HALL: Mr. President, Ladies and Gentlemen,—I do not know whether I should be in order in speaking on the subject. The difficulty I see in

regard to Dr. Sykes's motion is this. We all agree it would be most desirable to fix a minimum, but the difficulty is that it may be a means of closing a tremendous lot of fine-class houses. For example, all round this district, in the mansions which are let at high rents, many of the bedrooms are 7 feet high, the height he proposes, but it is perfectly possible that there are hundreds of other buildings, high class and low class, which are 6 feet 9 inches. Therefore, if this resolution were passed and carried into effect, we should be throwing out of occupation an immense number of houses, and that will mean that a huge number of houses would have to be put up to accommodate the people who were displaced. I would also further say that if it applies to new buildings it would be dangerous to put so low a minimum, because it is absolutely retrograde. Unless my recollection misleads me, the present Building Acts require that every dwelling-room, which is defined as a room in which persons pass the night, shall be of a minimum height of 8 feet 6 inches in new buildings, with the exception of the rooms in the roof, where the minimum height shall be 8 feet. Therefore, if it is suggested in this resolution, and it goes forth from here with the weight of this Congress, that a room 7 feet high will meet the reasonable requirements of sanitarians—(Dr. SYKES: No, no)—You know as well as I do that if you once put a minimum the tendency of builders and others—I am not saying it illegitimately—will be to work to the minimum, and that is a most undesirable thing. (Hear, hear.) What I am suggesting is that if the resolution is to be applied to new buildings, it is retrograde in its action; if, on the other hand, it is to be applied to existing buildings, I think it would be desirable first to make an investigation, and find out whether there may not be great numbers of rooms 6 feet 10 inches high, which by this resolution would be called a nuisance, and everybody would be prosecuted if they used those rooms. That would be a very dangerous thing to do. With reference to two or three other points, we should like to raise even the present standard. The window space is one which may reasonably be applied to every dwelling-room throughout the kingdom in all new buildings. We all agree that it would be most desirable that there should be some standard for all these points. There is a difficulty of making it to the satisfaction of the medical officers of health, gentlemen who are very highly respected and who are very eminent sanitarians who desire to do right. But we want to get somebody which is higher than the medical officers of health—for example, the Local Government Board—to make a standard. It ought not to be left to limited areas, because then great difficulties would arise. With regard to the question as to the introduction of fresh air into rooms, and the remark that was made that when we make provision for it by means of windows they are closed by people who do not like fresh air, no doubt that is a very practical difficulty which we, as architects, are largely troubled with everywhere. The great thing to aim at, if possible, is avoidance of draught, and that can only be done by making your apertures of a relatively large area, so that the velocity with which air may enter a room shall be low. If you could further arrange that the air shall be cut up into very fine streams—sprays, so to speak, of air—then you do avoid draught. That can be done with copper gauze, but

the difficulty is that copper gauze, in atmospheres like London, Leeds, and other big cities where there is so much soot, gets choked. If you could keep the gauze clean you would be sure of obtaining sufficient air in adequate quantities and without draught. With reference to standards, I would remark that there is a standard existing in poor law institutions, workhouses, and infirmaries now under the Local Government Board, which may reasonably, I think, be applied to other institutions.

Sir HENRY LITTLEJOHN: I beg to propose the following resolution: "That this Section is of opinion that the lighting and ventilation of workshops and factories is insufficient, and that the Home Office be requested to appoint a committee to inquire into the existing conditions with a view to fixing standards. That legislation is also required with the object of securing the periodic cleansing by disinfectants of factories and workshops, and also that the Local Government Board take similar action in regard to dwelling-houses."

Dr. ROBERTSON, *Sheffield*: I have very much pleasure in seconding that resolution, as one that meets with the suggestions I have already thrown out in my paper this morning. The question of dealing with workshops is a very urgent one indeed, and is one, I am perfectly certain in my own mind, from practical experience, which can be dealt with efficiently and without very great delay; but we must have some standards fixed before we can go very far.

Dr. SYKES: I think it would be advisable if Sir Henry Littlejohn——

The PRESIDENT: I must point out that we must proceed in order or we shall get into difficulties. Dr. Sykes has already moved a resolution which has not yet been seconded. If Sir Henry Littlejohn's resolution meets Dr. Sykes's view so far that he will withdraw his resolution, then I will put Sir Henry's motion to the meeting. In the meantime I have to point out that Dr. Sykes has moved a resolution which, unless it is seconded, must fall to the ground.

Dr. SYKES: As far as Sir Henry Littlejohn's resolution is concerned, I am quite prepared to vote for it, but it is such a very little resolution so far as dwelling-houses are concerned. For the factories the Home Office will do something, but there is no mention in his resolution of cubic space with regard to dwelling-houses, which is my principal point.

A DELEGATE: In order that we may proceed, I beg to second Dr. Sykes's resolution.

Dr. CHALMERS, *Glasgow*: May I be allowed to say a word on both resolutions. Dr. Sykes's resolution, if I understand it, fixes two standards; one is a cubic space standard, the other is a height of ceiling standard. I should like to tell you what we have done in Glasgow. We have a cubic space standard for houses under a certain measurement. For all houses under

2000 feet, we fix 400 cubic feet as being the minimum for adults. If you fix that cubic space standard, the height of the ceiling works itself out automatically, because if you must provide 400 feet for the individual, then it is simply a question of the floor area. I do not know if Dr. Sykes would be willing to alter his resolution by way of leaving out the height of ceiling, and fixing definitely on a cubic space standard. The other observation I wish to make is that the disinfectants proposed by Sir Henry Littlejohn will not get over the primary difficulty in factories or in workshops of the 250 cubic feet. I think we ought to express very definitely that under almost any conditions of labour 250 cubic feet is far too small.

Dr. SYKES: I am quite prepared to adopt Dr. Chalmers's suggestion if my seconder will allow me to withdraw. I should be content to get the cubic space. If Sir Henry Littlejohn will drop the dwellings out of his factories resolution, that will settle the whole thing.

Dr. HIME, *Bradford:* It is rather difficult to know exactly what is before the meeting at the present moment. As I take it, we are considering Dr. Sykes's resolution, while the other one is hanging in the air. In reference to Dr. Sykes's resolution I would venture most urgently to press upon this meeting not to carry it. (Hear, hear.) I think it is injudicious, and it is certainly not altogether founded upon fact. The latter remark is equally true with regard to Sir Henry Littlejohn's resolution, which, however, I must not speak on at the present moment. Dr. Sykes's strongest argument at the commencement of his address was that we wanted a definite standard. He said the use of the words "adequate and sufficient" space and ventilation, and so on, paralysed the action of the law. I venture to differ from him. I maintain that when a case comes before the bench which is to be decided as to the efficiency or otherwise of a place, the bench refers to the authority, and the medical officer of health is asked, "Do you consider that room is fit for work, or that dwelling is sufficient, or not?" The bench do not ask whether you have got to within a fraction of an inch of a certain standard; they say, "Is that dwelling or that room fit for human habitation?" and I doubt if any bench has ever refused to act upon the skilled opinion of a medical officer of health that a certain room was unfit for human occupation. (Oh, oh!) I believe that that view will be found to be the common practice, generally speaking, throughout the country. Dr. Sykes adopted another argument, and told us that definite standards were actually in existence in certain districts. He did not tell us whether the existence of those definite standards had had any effect. Have they been useful? Have they been acted upon by the medical authority in that locality where the minima are in force? If not, will we be any better off if, inconsiderately, this meeting passes, without reasonable opportunity of discussion, the question whether these minima are suitable to be adopted or not? But there is another point that I would urge as to the practicability of carrying out any such resolution. The sweeping statement is made that every dwelling-room or complete dwelling which does not come up

to this standard must be declared a nuisance, which is, I believe, an utterly impracticable thing. (Hear, hear.) It would have such an effect over the country that it would be perfectly impossible to carry it out, and it would fall to the ground by the weight of its own uselessness. What is to be done for the very poor? Are we to say that a poor man with a family shall not have any shelter at all, and that he must go to the workhouse? All the workhouses in the country would fail to provide accommodation for merely a fraction of the people which would be unhoused under this resolution, if it were carried into practical effect. I do hope the meeting will not carry it. I think Sir Henry Littlejohn's resolution is a little false on some points, but at the present moment I must not discuss it.

Dr. NIVEN, *Manchester*: Mr. President, Ladies and Gentlemen,—There are two separate and distinct resolutions before this meeting, and I do not see how it is possible to take them together. One resolution deals with the conditions in factories and workshops, leaving aside altogether the conditions of houses as connected with tuberculosis. The resolution relating to factories and workshops is based upon the proved fact that a large amount of infection accumulates in these factories and workshops. It is necessary to light and cleanse them in order to remove the infection, and it is necessary to ventilate them in order to maintain the health of the workpeople, so that they may resist any infection which may assail them. The other question of houses is an entirely separate one. I do think that this resolution of Dr. Sykes is a very complicated one, and as we have very great difficulties at present in dealing with overcrowding, we shall not be much better off by adding such a complicated resolution as this to a subject such as tuberculosis. Overcrowding is, perhaps, a minor factor in the introduction of tuberculosis, cleanliness being the major factor. I do think, therefore, that this resolution is a somewhat complicated one in connection with the subject. I do not say that it is not a good resolution in itself, but I think it is a somewhat complicated resolution in relation to this subject; at all events, I think the two resolutions should be taken entirely separately.

Dr. PORTER, *Medical Officer of Health of Shropshire:* May I ask a question? Dr. Sykes proposes fresh legislation to determine the height of rooms. I should like to know whether it is not a fact that under the Public Health Amendment Acts power already exists for a sanitary authority to make bye-laws regulating the height of rooms, and also under the same Act the sanitary authority has power to apply such bye-laws to old houses. I venture to suggest that before new legislation is asked for, the powers that the sanitary authorities already possess to regulate the height of rooms should be used.

The PRESIDENT: Dr. Niven has pointed out what, I think, is obvious to anyone who remembers the terms of the two resolutions of Dr. Sykes and Sir Henry Littlejohn, namely, that they deal with two different subjects. Therefore, I am afraid it is impossible to fix Sir Henry Littlejohn's resolution as an

amendment upon Dr. Sykes's, and they must be taken separately. We will deal with Dr. Sykes's resolution first.

Dr. S. R. MARSDEN, *Birkenhead:* Mr. President, Ladies and Gentlemen,—In dealing with Dr. Sykes's resolution, the remarks which have been made by Dr. Hime seem to me absolutely amazing. Dr. Sykes, with the usually clear instinct with which he grasps every question of administration, has put before you in the most lucid manner some of the greatest difficulties with which we have to deal as administrators. Dr. Sykes does not ask you to fix an absolute standard. He particularly pointed out that this is a matter for the Legislature to fix. We may discuss the matter, and say what we think is absolutely necessary, but we must leave it to the wisdom of the Legislature to say what the standard shall be. One gentleman pointed out that there would be great difficulties in dealing with existing houses. Undoubtedly there would be great difficulties; it is these very difficulties that we find want dealing with. We want powers to deal with the existing houses. We find every day that people are converting great big houses, which have been built for other purposes, into tenement dwellings, which are totally unfitted for the purposes, after sub-division, to which they are going to be put. We have no power of dealing with them. It does not matter whether it is a top attic or a bottom room, you have no power of limitation, which Dr. Sykes asks you to give. With regard to the appeal to magistrates, which Dr. Hime seems to think is such an efficacious method, my experience is that it is the most inefficacious thing that you can possibly do to appeal to a magistrate. In the first place, you may have a magistrate with a preconceived notion of his own, perhaps a faddist on the particular question, and perhaps an interested party in property of that kind. (No, no). I do not mean to say in the sense that he would be biased because of holding it, beyond the natural interest which you must have if you are the possessor of a large estate. The next magistrate you go before is an entirely different person, and the result is that the standard first goes up and then down. One magistrate may pay attention to what the medical officer of health says, and the other to somebody else. I know, for instance, of a town where there is a sanitary expert who is regarded as a far greater person than the medical officer of health—(hear, hear)—and when he was asked a question involving a very simple problem in physics in the law courts, he was unable to answer the question. That shows the danger of allowing these things to pass into the hands of lay magistrates. We all know that if magistrates are educated men, that sometimes within recent days they have come up from classes—— (Order, order). However, be that as it may. I do not wish to quarrel with the magistrates; only I do not wish them to have the power of quarrelling with me too much. I feel that Dr. Sykes has put the question in such a clear and advantageous manner that you cannot do better than support his resolution, leaving Parliament to fix the standard.

Dr. CALDWELL SMITH: I should like to make a suggestion. Dr. Chalmers in his remarks mentioned the 2,000 feet in the Glasgow houses. They have

power there to ticket a house, stating the number of occupants. If a resolution was passed by this meeting embodying the powers which the Police Act of 1860 gave to the Glasgow Corporation, and which I believe were extended to the Act of 1890, it would get rid of the whole difficulty. It would give power to the sanitary authority to put a ticket on each dwelling, saying, "This house will only accommodate so many persons." If they went beyond that number the sanitary authority could at once take action. I know the benefit that has accrued in Glasgow from that, and I am certain from my experience in London that it would be of the very greatest advantage in the poorer dwellings here.

The CHAIRMAN: The resolution is: "That in the opinion of this Section the following conditions of dwelling-rooms should be dealt with as nuisances:—

"Any dwelling-room used for sleeping so overcrowded as to be injurious or dangerous to the health of the inmates, whether or not members of the same family—that is to say, in which each inmate over ten years of age is provided with less than 400 cubic feet of air space, and each inmate under ten years of age with less than half that amount.

"Any dwelling-room not having one or more windows opening directly into the external air, with a total area clear of the sash frames equal to at least one-tenth of the floor area of the room, and so constructed that one-half at least of each window of the room can be opened, and the opening in each case extends to the top of the window."

The resolution was then put, and lost.

The PRESIDENT: I will now, with your permission, as time presses, put to you Sir Henry Littlejohn's resolution: "That this Section is of opinion that the lighting and ventilation of workshops and factories are insufficient, and that the Home Office be requested to appoint a committee to inquire into their existing conditions, with a view of fixing a new standard; also that the Local Government Board take similar action in regard to dwelling-houses, and that legislation is required with the object of securing the periodic cleansing by disinfectants of factories and workshops."

Dr. ARTHUR RANSOME, *Bournemouth:* The first part of that resolution is not necessary, because the Home Office has already appointed a committee on the subject.

Dr. HIME, *Bradford:* Will you allow any discussion on this resolution? It has not been before the meeting yet.

The PRESIDENT: I am in the hands of the meeting, but I must remind you that less than an hour remains to discuss the other subject on the paper, namely, "The Control of Meat Supplies."

Dr. HIME, *Bradford:* I simply wish to point out that the resolution starts

off by what cannot be considered a fact—that the lighting and ventilation of factories are insufficient. I live in a district in Yorkshire which is a factory district, and I am able to declare, from my own personal experience, that the great majority of the workrooms and the factories there are huge, enormous in size, and there is far more glass in the walls than there is brick or stone. So that to get up and say to the meeting they are insufficiently lighted is entirely misleading. Probably the gentlemen who said so are not acquainted with the facts of the case. I do urge that that paragraph ought to be left out of the resolution. The Medical Officer of Health for Sheffield can speak to this fact—that in a large number of the factories in Sheffield there are no windows at all. They are open to all the winds of heaven. Surely there is enough ventilation there and plenty of light. It is absurd to make the assertion made at the beginning of the resolution, and it really does not convey the truth to this meeting, and ought to be withdrawn.

Councillor E. E. LAWSON, *Leeds Corporation:* Mr. President, Ladies and Gentlemen,—I should like to associate myself with the remarks of the last speaker. As a manufacturer from Yorkshire, and as one employing something like 1,700 or 1,800 hands, I protest most strongly against the assertions made with regard to factories. I am engaged in the engineering trade, and, if you would go into our factory, you would find the floors swept every morning, and the whole place as clean as it is possible for it to be kept. As to disinfection under the factory laws, already we have to whitewash our place once or twice a year, and for a section of such an important Congress as this to give its countenance to what I cannot but characterise as a ridiculous resolution—I am sorry to have to say this, because the gentleman who moved it is a gentleman of eminence and very well known indeed, and it seems almost an impertinence on my part to apply such an epithet to him—is altogether without reason. We are here trying to better the conditions of the working people. I speak as a layman amongst a large number of medical gentlemen, a profession I have a very great respect for, but still at the same time I do think that the tone of some of the remarks which fell from Sir Henry Littlejohn and other speakers, as to manufactories and municipalities, is altogether wrong. According to him, the manufacturers are the people that ought to be very well looked after indeed, and the municipalities are the people who are appointed solely for the purpose of looking after the manufacturers. I happen to be a member of both, and I see no reason why those two bodies should not work in conjunction with each other rather than be antagonistic. I would ask you, gentlemen, representing as I do a very large manufacturing district, Leeds, that you will not countenance such a resolution, dealing in such vague generalities as this one does. (Cheers.)

Sir HENRY LITTLEJOHN: Of course, I must accept the statements of the gentlemen who have just spoken, and, with the permission of the meeting, I beg to suggest that my proposition reads as follows: "That this Section is of opinion that no sufficient security exists for the proper lighting and

ventilation of factories and workshops, and that the Home Office be requested to appoint a committee to inquire into their existing conditions with a view to fixing a standard." (No, no.)

A DELEGATE: I respectfully move that we pass on to the next business.

A DELEGATE: I second that.

A DELEGATE: I hope this resolution will not be withdrawn, because it is a most important one.

A DELEGATE: I suggest that the resolution should be withdrawn.

Sir HENRY LITTLEJOHN: My seconder will not allow me to withdraw.

The PRESIDENT: I think the most convenient way will be if I submit the resolution at once. It is: "That this Section is of opinion that no sufficient security exists for the proper lighting and ventilation of factories and workshops, and that the Home Office be requested to appoint a committee to inquire into their existing conditions with a view to fixing a standard."

The resolution was then put, and lost.

Time did not allow of the following papers being read during the discussion, but they are herewith reproduced:—

A STANDARD OF VENTILATION FOR THE OPEN-AIR TREATMENT.

BY F. RUFENACHT WALTERS, M.D., *London.*

IN text-books on hygiene it is usually stated that rooms containing not more than 2 parts in 10,000 of respiratory CO_2 may be regarded as well ventilated. Doubtless many bedrooms and sitting-rooms in our towns and villages do not even come up to this standard, so that we regard with complacency those which do. The object of the present communication is to remind my professional colleagues that a still higher standard is needed for the open-air treatment of consumptives, where our endeavour is not merely to keep others in health, but to restore them to health. Judging by the facts revealed by personal visits to many sanatoria in this country and abroad—especially, perhaps, the latter—it is clear that the problem of hyperaeration is completely disregarded, while much ingenuity is sometimes expended in elaborate precautions against the entrance of too much fresh air. If these bad precedents—some of them set by influentially supported and palatial institutions—are followed in the British sanatoria now being started or erected, the open-air treatment will inevitably be discredited, and much harm done to the sufferers from pulmonary tubercle.

Living in the open air, the sense of smell becomes trained to distinguish

slight departures from atmospheric purity; and rooms with no more than the usual amount of ventilation are noticed to be distinctly "stuffy." This is mainly owing to organic impurities; but in confirmatory experiments it is permissible to measure the CO_2, which is roughly proportional to the amount of organic matter. This I have done by means of Lunge and Zeckendorff's method, which depends on the decolourisation of phenolphthalein in an alkaline solution. I have in this way satisfied myself that it is perfectly possible by natural ventilation to maintain the air of a room in a state of purity approaching that of the open air, and that we should not be satisfied if more than 1 part in 20,000 of respiratory CO_2 is present, or 4·5 parts in 10,000 total CO_2. Testing the air of a small bedroom of 1100 cubic feet capacity in the country, I found after a night's rest with one occupant 4·8 parts total CO_2 if three windows (15 sq. ft.) were open, and 6·2 if only one (5 sq. ft.) was open. This was a room in an ordinary house, with an open chimney, the door kept shut. The window faced west, and on each occasion there was little or no wind, the temperature about sixty-five degrees out of doors, and indoors a few degrees higher. Much better results were obtained in the bedroom of a sanatorium inhabited for many days and nights in succession by a febrile patient. This room was of about the same cubic content, provided with air-shaft into the open air instead of a chimney, and with about 32 sq. ft. window space, and a door of about 18 sq. ft., all kept constantly open and in free communication with the open air. Here the proportion of total CO_2 was well under 4 parts in 10,000, or not perceptibly different from that of the air outside.

And this brings me to a practical point—that for open-air treatment ventilation should be by large openings on opposite sides of the room. People have a morbid fear of draughts if the door is opened as well as the window; and yet in this country for the greater part of the year ventilation will be insufficient for curative purposes without a large opening opposite to the open window. Dr. Walther, of Nordrach, says that from the moment a patient comes to him until the moment he leaves, he is either out of doors or in a thorough draught; and there is no practical reason why we should not make similar arrangements in this country; indeed, some of us do. With a brisk wind blowing sufficient fresh air may enter by one large inlet; but in still weather, when there is little difference between the inside and the outside temperature, purification is too slow to be satisfactory without a large outlet opposite the inlet. We cannot depend on difference of temperature as a ventilating agent in a sanatorium, because over-heated rooms, or indeed rooms much raised above the outside temperature, are bad for our patients. The idea that the discomfort of open-air treatment in winter can be safely mitigated by warming the incoming air is entirely mistaken. To begin with, the average patient in bed or on couch does not feel discomfort from open air if he is properly protected. At most a hot bottle may be required. And in the next place, by warming the incoming air you destroy some of its ozone, as is well known. To warm the patient, or the room itself in moderation, is permissible; but the air cannot be too cold in

this country for the good of the patient. Probably the only exceptions to this rule are some patients with bronchitic or cardiac complications, who would do better in a warm dry climate. At a celebrated sanatorium abroad, I found that the windows of the dining-room were closed before patients came in to dinner, after which there was only such ventilation as could be effected through air-shafts and Tobin's tubes—to my mind quite an inadequate amount. A safer rule is to ventillate freely from several sides, and never to close all the windows. One dining-hall with which I am acquainted has twelve large windows, six of which are open throughout the year in all weathers, and few of the diners ever object to this amount of fresh air.

Even in a verandah there is the same problem of ventilation to be considered. Dr. Pruen, of Cheltenham, has laid down the rule that no verandah should be deeper than it is high. At the North London Hospital for Consumption large galleries have been erected as fresh air wards. Each of these is 66 feet long, and about 12 feet deep and 12 feet or a little more in height. The ends are glazed; the back has a glazed screen with a door and a few windows; the front is entirely open, with just a balustrade and a vertical sun-blind. There is thus about 420 sq. ft. of absolutely open space in front, in addition to 240 ft. more of more or less open balustrade, or (ignoring the latter) 35 sq. ft. per head of open window space which cannot be closed. And yet with this large provision of inlet, the air on two occasions was noticed to be distinctly "stuffy" during the early morning visit. The cure consists in providing outlets at the back leading into the open air. To build two rows of rooms or wards greatly increases the difficulties of ventilation, unless the doors are so arranged as to be incapable of being closed. A room with only a front opening is in much the same position (only different in degree) as a back-to-back dwelling, which is nowadays universally condemned by authorities in hygiene, even if health authorities are still sometimes found to pass them over; but such an arrangement is quite inadmissible in a sanatorium, and should always be rejected whenever real open-air treatment is required.

INFLUENCE DU LOGEMENT ET DE L'AGGLOMÉRATION.

PAR MONSIEUR GEORGES PICOT,

Secrétaire Perpétuel de l'Académie des Sciences Morales et Politiques, Institut de France.

D'AUTRES répondront avec une compétence technique à la question du programme; il a paru utile de présenter au Congrès en un résumé très bref ce qu'on pense en France et ce qui a été fait.

Nous n'insisterons pas sur l'action des savants, des médecins, de tous les hommes d'études s'accordant depuis Villermé en 1850 jusqu'au Docteur Brouardel en 1900 pour montrer l'influence désastreuse du logement insalubre; sur ce point, l'unanimité du corps médical français a été absolue. Les

rapports à l'Académie de Médecine, les brochures, les articles de revue formeraient une bibliothèque, et les découvertes de Pasteur n'ont fait que confirmer, sous la forme la plus précise, ce que l'observation des médecins avait déjà signalé.

La vue du mal n'a, pour ainsi dire, qu'une valeur théorique, si elle ne détermine pas à trouver le remède et à en user.

L'effort accompli par les pouvoirs publics et par les particuliers doit donc être tout spécialement noté; ce qui est surtout digne d'attention, c'est de constater que l'initiative privée, longtemps indifférente, s'est enfin éveillée depuis quelques années et que ce mouvement de plus en plus sensible seconde efficacement les avertissements de la science.

I.—Action des Pouvoirs Publics.

La loi de 1850 sur les logements insalubres, la première en cette matière qu'ait votée le Parlement, n'était exécutable que dans les grandes villes. Des commissions constituées par les conseils municipaux étaient chargés de visiter les logements dont l'insalubrité leur était dénoncée, d'ordonner des travaux d'assainissement, de faire dresser des procès-verbaux, et de les transmettre aux magistrats afin de provoquer l'application des peines.

L'exécution de la loi de 1850 a été assez inégale; suivant la composition des commissions et la bonne ou mauvaise volonté des municipalités, elle a produit quelqu'effet ou elle est demeurée inefficace. C'était une arme qu'il fallait savoir manier et la plupart de ceux à qui elle était confiée l'ont laissée au fourreau.

Peu d'années après, les grands percements de boulevards et d'avenues ont détruit une quantité de logements insalubres; ils ont eu surtout cet incomparable avantage d'amener l'air au centre de Paris. Le résultat eut été tout à fait heureux si, aux extrémités de la ville agrandie, ne s'étaient formées des accumulations d'habitations médiocres.

L'œuvre de désinfection légale la plus efficace fut tentée, puis accomplie par la préfecture de police à Paris, de 1878 à 1883. Les logements en garni rentrent dans ses attributions; le préfet de police a sur eux un droit de surveillance. Le 7 mai 1878, il rendait un arrêté édictant une série de prescriptions concernant l'aération des chambres, décidant que le nombre de personnes y couchant sera proportionnel au volume d'air, que chaque habitant devra avoir 14 mètres cubes. La tenue des w.c., leur désinfection, le service d'eau sont prescrits avec précision; les escaliers, paliers, corridors doivent être régulièrement lavés et peints fréquemment, toujours en couleur claire. Les préfets de police qui se sont succédés depuis 1878 ont tenu la main à l'exécution de ces prescriptions; il les ont confirmées et développées; une enquête récente a permis de constater que les conditions hygiéniques des garnis de Paris sont supérieures à celles des habitations non-soumises à la surveillance.

La statistique a confirmé ce fait. Tandis que, dans les anciennes épidémies qui avaient atteint Paris, les garnis avaient été des foyers d'infection,

il a été reconnu qu'en 1892, pendant la dernière invasion cholérique, les cas de maladie et de mort dans les garnis ont été moins nombreux que dans les maisons environnantes.

Les maisons neuves sont soumises à des mesures très sévères.

Tout propriétaire, tout architecte, tout entrepreneur doit soumettre, avant de construire, ses plans, à l'administration de la Ville de Paris; si, au point de vue de l'hygiène, de la disposition des w.c., de l'élévation insuffisante des planchers, l'architecte ne s'est pas conformé aux règlements, les plans sont rejetés. Il en résulte que l'insalubrité porte presque toujours sur les vieilles maisons. Les habitations neuves ne sont pas insalubres par elles-mêmes, par suite d'un vice de construction, mais parce que les habitants en ont abusé; c'est l'usage excessif, par exemple trois ou quatre personnes couchant dans une chambre faite pour un seul locataire, qui altère les conditions primitives.

A ces lois de précautions, le législateur en a ajouté une nouvelle en 1894. Estimant qu'il n'y avait pas assez de logements salubres et à bon marché, il a voulu exciter aussi bien les ouvriers que les sociétés de construction à en élever. Nos statistiques fiscales démontrent que sur les dix millions de français électeurs, il y en a plus de quatre millions qui possèdent leur habitation.

On pourrait dire, si l'on pouvait lire dans les cœurs, que les ouvriers pères de famille qui ne possèdent pas leur maison rêvent tous de l'acquérir.

Pour déterminer ce mouvement, la loi du 30 novembre 1894 a prescrit la constitution, partout où le vœu en serait manifesté, de comités locaux d'habitation à bon marché dont le rôle serait de faire une propagande en faveur de la construction, de susciter la création de sociétés entre propriétaires ou entre ouvriers en vue d'élever de petites habitations. A ce genre spécial de construction, des dégrèvements d'impôts sont promis. Depuis 1894, un grand nombre de comités ont été formés; des enquêtes très bien faites ont été poursuivies dans les villes les plus peuplées et de leur résultat est issu un mouvement.

On pense assez généralement en France que des lois d'hygiène sont nécessaires, que la loi sur les logements insalubres ne répond plus aux besoins de notre temps. Le Parlement s'occupe sérieusement de cette législation; mais on ne croit pas que l'État, ni les municipalités aient à se mêler directement de la construction. Cette tâche appartient exclusivement à l'initiative privée.

II.—Initiative Privée.

L'ouvrier isolé peut très difficilement, avec ses seules ressources, se construire une habitation. Il ne possède pas le capital nécessaire. Tandis qu'un effort de quelques mois lui permet d'acquérir un vêtement plus chaud, l'épargne qui lui permettrait l'acquisition d'une maison exige de longues années de patience.

Ceux qui possèdent des capitaux peuvent seuls lui venir en aide. C'est un service que le capital doit rendre à ceux qui travaillent. En effet, ce sont les industriels et les propriétaires qui se sont occupés les premiers de cette question. Un Français dont l'exemple a été suivi, M. Jean Dollfus a créé en

1853 une société qui a doté la ville de Mulhouse de 1,200 maisons dont les habitants sont devenus propriétaires en versant, en sus du loyer, un amortissement ; cette société n'a cessé de fonctionner et de multiplier les habitations à mesure que l'agglomération s'étendait.

Des chefs d'industrie ont construit autour de leurs établissements des milliers de maisons salubres en les louant à leurs ouvriers à très bas prix. On peut dire que ce fait est général en France, la grande industrie estimant qu'une de ses charges est de faciliter le logement de ses ouvriers. Il arrive même que souvent elle donne gratuitement l'usage de la maison, comme un supplément de salaire. Un petit jardin est presque toujours joint à l'habitation. Des milliers d'ouvriers sont donc logés ainsi dans de bonnes conditions d'hygiène.

Ce systeme, applicable lorsque l'industrie est établie à la campagne où dans les environs des villes, ne peut être mis en usage dans l'intérieur de nos grandes cités.

À Paris, à Lyon, à Rouen, à Marseille, des sociétés de capitaux ont entrepris d'élever des maisons types, rappelant à quelques égards les plans de la fondation Peabody ou de Sir Sidney Waterlow. Les distributions de logements sont favorables à l'aération, les fenêtres sont larges, les cabinets pourvus d'eau en abondance, les escaliers très clairs, les corridors partout supprimés.

Mais, tandis qu'à Londres chaque maison (block) contient des centaines de locataires, à Paris une maison n'a au plus que cinquante logements. Deux sociétés, la Société Philanthropique et la Société des Habitations Économiques, toutes deux présidées par le Prince d'Arenberg, ont construit à Paris quinze maisons et logent plus de 700 locataires comprenant environ 2,000 personnes.

À Lyon, la Société des Logements Économiques a élevé 120 maisons où logent 1,500 familles.

Ces sociétés n'ont pas la prétention, à elles seules, d'améliorer et d'assainir le logement des ouvriers de leur ville. Elles ont voulu élever des types qui seraient imités. Elles y ont pleinement réussi. Dans les quartiers qu'elles ont choisis, toutes les maisons neuves s'inspirent de leurs améliorations, et ces maisons neuves rapportent à leurs constructeurs un intérêt commercial. On commence donc à voir le succès d'une transformation qui se fera au profit de l'hygiène publique. Dans ces maisons, la famille se reforme et se développe ; le père heureux de son intérieur riant s'y attache. M. Jules Simon a dit : "Le logis hideux est le pourvoyeur du cabaret." On peut dire dans le même sens : Le foyer agréable est le seul moyen de lutter contre l'alcoolisme.

La tâche que tend à accomplir la Société Philanthropique de Paris est de rechercher les lacunes et de s'ingénier à les combler. Frappée de constater que l'ouvrière honnête ne savait où loger, elle construit en ce moment un "Hôtel meublé pour dames et jeunes filles," où sera reçue toute femme qui se présentera seule, moyennant un prix de 70 centimes à un franc par nuit suivant la chambre.

Il se produit depuis un an ou deux un grand mouvement en faveur de

maisons de famille pour les jeunes ouvrières. Elles y sont reçues et groupées en famille et mises par là même à l'abri des plus graves dangers.

Pendant que les personnes disposant de capitaux agissent, les ouvriers qui n'ont pas de grandes épargnes, essayent de se grouper ; il se forme entre eux des sociétés co-opératives de construction. Les associés mettent en commun leurs épargnes et commencent à construire. Ils empruntent à des sociétés de crédit auxquelles l'État (Caisse des Dépôts et consignations) prête au taux de faveur de 2 par cent. Depuis peu, plusieurs sociétés se sont constituées de la sorte. Pour aider à la propagande un groupe d'hommes dévoués à cette œuvre ont fondé en 1890 la "Société Française des Habitations à bon marché (dont le siège est à Paris, Rue de la Ville l'Evêque, No. 15). Cette société publie un bulletin, contenant des plans, des modèles de statuts, des rapports ; elle envoie des conférenciers dans toute la France et suscite la création de sociétés de construction.

En résumé, le besoin est général et l'effort est partout : sociétés de capitalistes, sociétés co-opératives, sociétés philanthropiques, généreux fondateurs imitant M. Peabody, caisses d'épargne employant leurs réserves, toutes les forces libres et vives de notre pays sont convaincues que l'amélioration des petits logements est un devoir social et pour en revenir à l'objet du Congrès, que cette transformation s'impose au nom de la salubrité publique.

Par Monsieur HEPPENHEIMER,

Vice-Président du Conseil des Prud'hommes, Membre du Conseil de Surveillance de l'Assistance Publique, Délégué Cantonal.

Messieurs,—Le progrès effrayant de la tuberculose a des causes bien variées, une m'apparaît comme dominante, c'est les moyens précaires d'existence des travailleurs ; ainsi, il est certain qu'un homme gagnant 7 francs par jour, et ayant seulement 4 enfants, n'est plus en état de se defendre contre la tuberculose ; comment le ferait-il en effet ? avec 4 enfants la femme ne peut se livrer à d'autres travaux que ceux du ménage ; le salaire de l'homme doit donc valoir pour 6 personnes. Le logement, qui au début du ménage était fixé sur les ressources communes du mari et de la femme, en même temps qu'il est devenu trop petit est devenu trop cher. On abandonne le logement salubre et sain pour le bon marché et les pièces plus petites mais plus nombreuses. A partir du jour où le soleil n'égaie plus le logis de sa vivifiante lumière, la ménagère perd le goût du nettoyage minutieux ; à quoi bon les fleurs, puisqu'elles meurent sans avoir eu le temps d'embaumer l'air, et pourquoi allumer de la coûteuse lumière pour chasser la poussière dans ces coins insondable à l'œil ? Et ici commence la conséquence sociale. La femme et les enfants s'énervent dans ce local trop petit, et l'homme en rentrant le soir d'une journée de travail pénible et longue, au lieu de caresses, n'a chez lui que la triste indifférence de sa femme et les cris, les jeux tumultueux, des enfants trop à l'étroit ; aussi ne vous étonnez pas qu'à la première occasion il

s'attarde au cabaret, et le premier verre gagné aux cartes est une plaie nouvelle qui s'ouvre au cœur de la famille.

Dans ces conditions et dans la plupart des cas semblables, l'homme est perdu pour son pays, ce n'est plus qu'un être dont les qualités diminuent chaque jour davantage, et la femme et les enfants, en même temps qu'une charge, deviennent un danger constant pour la société. Car grandissant en dehors de tous soins d'hygiène, ils sont comme offerts en holocauste à toutes les contagions, en tous cas candidats permanents à la tuberculose. Que pensez-vous, messieurs, que puisse être l'opinion d'un enfant, *si sa raison est sortie saine et sauve de ce milieu*, quand homme, et connaissant la genèse de sa famille, il se sent touché par la terrible phtisie? J'ai, messieurs, entendu des imprécations terribles des malheureux, dont la souffrance égarait la raison, qui généralisaient les responsabilités, et menaceaient, pour se venger, d'aller cracher sur les tapis des riches.

Pour remédier à ces abominations, je crois, messieurs, qu'il faut que vous indiquiez par des vœux bien clairs les réformes urgentes et indispensables que doivent réaliser les pouvoirs publics.

Premièrement permettez-moi de vous signaler que vous n'avez pas à vous effrayer de la conséquence sociale du vœu, puisqu'il a pour but de remédier à un mal ayant une origine et des conséquences sociales.

Donc 1°, émettre un vœu pour que la journée de tous les travailleurs n'excède pas huit heures de travail, avec un salaire normal fixé par les corporations.

2°. En ce qui concerne les logements, ajouter aux vœux de la Commission des logements insalubres modifiant la loi du 13 avril 1890, et présentés au Congrès International d'Hygiène et de Démographie de 1889 à Paris, que l'impôt des portes et fenêtres sera renversé, c'est-à-dire que pour favoriser l'air et la lumière les maisons seront imposées par surface non-ouverte.

3°. Des autorisations de construire ne seront accordées qu'à la condition que propriétaire et architecte se conforment à un plan général delibéré par un conseil national d'hygiène.

4°. Une fois tous les trois ans la réfection intérieure de tous locaux habités devra être faite après avoir été préalablement désinfectés.

5°. Tous locaux devenus vacants ne pourront être loués sans avoir été préalablement désinfectés, les papiers peints grattés et remis à neuf.

6°. Tous les chefs d'industrie devront par section d'atelier mettre à la disposition des ouvriers des armoires aérées pour les vêtements de ville, et des lavabos avec essuie-mains.

DIVISION II.

PART II.

THE CONTROL OF MEAT SUPPLIES.

The following paper by Mr. Shirley Murphy (County Medical Officer of London) was read by Dr. Hamer, in the absence of the author :—

WHAT ADMINISTRATIVE MEASURES ARE NECESSARY FOR PREVENTING THE SALE TO THE PUBLIC OF TUBERCULOUS MEAT.

By SHIRLEY F. MURPHY,

Medical Officer of Health of the Administrative County of London.

When I was asked to open a discussion at this Congress on the administrative measures which are necessary for preventing the sale to the public of tuberculous meat, it was at once obvious to me that no new material, no new fact could be submitted to the meeting. The measures which are necessary are well understood by those who have directed their attention to the subject, and what is wanted now is not the knowledge by such persons of what to do, but the education of the public in the necessity for adopting in this country measures which have been tried and found successful elsewhere. In England we are always slow to modify our procedure, and in any matter which is held to affect a trade interest especially slow, for this interest at once provides an opposing force which renders the education of the public difficult. This force is able to manifest its power from the beginning and at a time when the public concerns itself little with the subject. It is only at a later stage that the public finds it has an interest at stake and that it must bestir itself to put law makers and law administrators in motion. When once this position is arrived at we may look forward to success. Our Congress may do much by discussion of this subject to create a wider interest in it, and by influencing public opinion to bring about the result which is hoped for by those who see the need for better supervision of meat supplies.

It is not within our province in this Section to consider whether or not the consumption of the meat of tuberculous animals is prejudicial to man. The title of the subject which I am invited to discuss implies that tuberculous meat must be excluded from the food supply. This question has been considered by two Royal Commissions, the second of which was presided over by our chairman, Sir Herbert Maxwell. I shall later have to mention the conclusion at which the first Commission arrived, and this because it has a necessary bearing upon the sort of administration which is needed, but I shall accept its conclusions and shall not enter into a discussion of pathological questions. I may, however, in commencement, briefly refer to the frequency

with which tubercular disease affects cattle and the proportion of those which are slaughtered which must be deemed to be unfit for human food.

If animals were rarely affected with this disease, it might be difficult on this ground to claim the institution of an administration to prevent the sale of their meat to the public. This, however, is not the case, and it will suffice in evidence of this contention to quote the figures published by the first Royal Commission. This report shows that during a period of four years in the Copenhagen slaughter-house 17.7 per cent. oxen and cows and 15.3 per cent. of swine were found to be tuberculous, and that in the Berlin slaughter-house in one year 15.1 per cent. of oxen and cows and 1.55 per cent. of swine were found to be tuberculous. Of the oxen and cows in the Berlin slaughter-house, 1.26 per cent. were condemned on account of tuberculosis, and 0.23 per cent. of swine. The report further says that the Commission has reason for thinking that in this country "the facts about tuberculous animals would exhibit a broad resemblance to the foregoing, if such records could be obtained." The figures obtained from public slaughter-houses in England are in no way conclusive of the number of animals intended for food which are tuberculous, or which are found to be unfit for human consumption. At the present time there is no need for the owner of an animal presenting signs of disease to have it slaughtered under conditions which would ensure its inspection; he can easily kill it elsewhere. I may state that among 18,440 cattle slaughtered in the Manchester public slaughter-house in 1896, 48½ carcases of cows, and three carcases of bullocks were condemned on account of tuberculosis, or about ·3 per cent., being but about one-quarter of the proportion condemned in the Berlin slaughter-house. Mr. James King, the Veterinary Inspector of Manchester, who supplied the figures relating to that city, stated to the second Commission that very few cows are sent to the public slaughter-house from the country round. "People," he said, "are a little frightened to send cows to the abattoirs. They do not care to send them in where there is rigorous inspection." The cows go, he thought, to the districts outside, because the Manchester market received a greater number of cows dressed than live cows coming to the abattoirs. The carcases are brought in if it is thought they will pass in the Manchester market, and no doubt if they are badly diseased they are retained outside. That was his opinion about the matter. Mr. King is an officer of much experience, and his statements suffice to show that we must not assume that only one bovine animal in every three or four hundred is unfit for human consumption, for those entering the Manchester slaughter-house must be regarded as exclusive of a number which the owners believe to be too diseased to submit to inspection. It would be interesting to know what happens to those which are "retained outside," but for the moment I am only concerned to show that the proportion of cattle in this country which are tuberculous and which are unfit for human consumption is so large that if the public desire to avoid the consumption of their flesh they must provide an administrative system for the purpose. I may add the figures of another city to the above, taken also from the report of the second Commission.

Dr. Hope, Medical Officer of Health of Liverpool, stated that of 16,340 cattle slaughtered in the public slaughter-houses the carcases of 214 were destroyed on account of tuberculosis, *i.e.*, about 1·4 per cent., or about the proportion in Berlin.

In the two cities I have referred to it has not been the practice to condemn the flesh of all animals which have suffered from tubercular disease. Mr. King stated that in Manchester, "If the disease is generalised the whole carcase is condemned; if it is only localised, the localised part is removed and the remainder is passed. In Liverpool, Dr. Hope said if the disease were confined to the lung, and the carcase generally deteriorated, then the carcase is seized, and it is also seized if the disease is very extensive and the carcase is not deteriorated.

I may now turn to the consideration of the amount of tubercular disease which must be deemed to render the flesh of animals unfit for human consumption. Turning first to Germany, we find the practice is as follows:

In Prussia the law of 1892 provides that (1) the flesh of tuberculous cattle is deemed unfit for food if it contains tubercle, or if the tuberculous animal is emaciated, although there may be no tubercle in the flesh. (2) The flesh of tuberculous cattle may be considered fit for food if the animal is well nourished and (*a*) the tubercle is found solely in one organ, or (*b*) in the event of two or more organs being diseased these organs lie in the same cavity of the body and are directly connected with each other either through the lymph vessels or through blood-vessels, which do not belong to the general circulation, but to the lungs and portal circulation.

In Bavaria the law of 1892 provides that the flesh of cattle and swine shall be deemed fit for food if the tuberculosis is localised and in the first stage of development, and the animal is in a well-nourished condition. The flesh is to be considered unfit for food if the animal is suffering from generalised and advanced tuberculosis, and at the same time shows signs of emaciation.

In Saxony the law of 1892 provides that the flesh of a tuberculous animal is to be deemed unfit for food (1) if the tuberculosis has so far developed as to lead to emaciation, and if the flesh differs in appearance from that of healthy flesh; (2) also if the same is generalised, *i.e.*, if the spread of the tubercular processes in the body can have taken place only by the circulation of the blood (excepting the portal circulation) and at the same time emaciation exists in a high degree, or the meat, or the bones, or the lymph glands belonging thereto are impregnated with tubercle; (3) also if the disease is in the form of a generalised miliary tuberculosis with fever.

In France, the law of 1888 prohibits the sale of the flesh of tuberculous animals—(1) if the lesions are generalised, *i.e.*, not confined exclusively in the visceral organs and their lymphatic glands; (2) if the lesions, although localised, have invaded the major portion of a viscus or show themselves by occurring on the walls of the thoracic or abdominal cavities.

The second Royal Commission recommended that the entire carcase and all the organs should be seized if (*a*) there is miliary tuberculosis of both lungs; (*b*) when tuberculous lesions are present in the pleura and peritoneum;

(*c*) when tuberculous lesions are present in the muscular system, or in the lymphatic glands, embedded in or between the muscles; (*d*) when tuberculous lesions exist in any part of an emaciated carcase. The Commission further recommended that the carcase, if otherwise healthy, shall not be condemned, but every part of it containing tuberculous lesions shall be seized (*a*) when the lesions are confined to the lungs and the thoracic lymphatic glands; (*b*) when the lesions are confined to the liver; (*c*) when the lesions are confined to the pharyngeal lymphatic glands, and (*d*) when the lesions are confined to any combination of the foregoing, but are collectively small in extent. In the case of the flesh of the pig it is recommended that, in view of the greater tendency to generalisation of tuberculosis in that animal, the presence of tubercular deposit in any degree should involve seizure of the whole carcase and of the organs.

If we may assume that it is necessary in the interest of the public health to enforce the requirements of these laws and recommendations, and I see no reason for any other view, we are obliged to consider the course which should be adopted for that purpose.

The law in England as to meat inspection differs at the present time materially from that of other countries. In England the responsibility of determining whether the flesh of animals is fit or unfit for human food is cast upon the butcher. He is presumed to have sufficient knowledge for that purpose, and the duty which is cast upon the sanitary authority is to see that he exercises his judgment properly. If he is found offering for sale meat which is unfit for food he cannot claim ignorance as his excuse, his meat is seized and he is subjected to penalty. The alternative method, which is that adopted in other countries, where there is systematic meat inspection, casts the duty of determining whether the meat is fit for human food on the local authority. The butcher brings to them the live animal he is going to slaughter or the flesh of the slaughtered animal, and they determine whether or no it shall be sold for food. While in England, therefore, meat is only occasionally inspected before sale, in the countries referred to it is always inspected before sale. Which of these two methods is fairer to the public and to the butcher? Obviously it is impracticable to require all butchers to possess the knowledge which is implied in the regulations as to the meat of tuberculous animals which I have stated above, and, further, it is practically impossible to ensure that each of them will observe these regulations unless complete machinery is provided for this purpose. What, then, have other countries done in this matter?

For what follows I am largely indebted to Professor Ostertag's excellent work on meat inspection. In Belgium the law of 1890 requires that "all animals, including pigs, whose flesh, intestines, fat or blood is intended for human food, must be examined, after slaughtering, by an expert who is either appointed by the town, or if this does not occur, by the government for the commune in which the slaughtering takes place, and the communes may require inspection of the animal before slaughter. The conditions under which this is to take place are prescribed by the commune, which also bears

the cost. The inspection is generally made by veterinary surgeons. Inspection of the carcase and viscera must take place at the latest twelve hours after the slaughtering in summer, and twenty-four hours in winter, and the carcase must not be cut up before inspection. The abdominal viscera must be taken out before the arrival of the expert and so preserved that their connection with the particular carcase can be recognised; in the case of solipeds, the thoracic viscera, the bronchial tubes and larynx must remain in their natural position. If after the examination the meat, viscera, etc., are found to be healthy the expert must stamp them with an approved stamp, large animals in at least every quarter and small animals in at least every half. If on examination the whole or part of the animal is considered unfit for food, notice has to be given to the burgomaster, who gives orders as to what shall be done with the carcase. If the owner of the animal is dissatisfied, an appeal is provided. It is unlawful to sell meat which has been slaughtered contrary to these regulations and in the case of meat brought in from outside it is required that only the whole or the half or the quarter of the carcase shall be brought in, and the lungs must remain in their natural position; all must be examined and stamped. In Southern Germany, in part of Western and part of Central Germany and in the free cities of Bremen, Lübeck, and Hamburg there has been regulated meat inspection for a number of years. Animals intended for human food have been required to be examined before and after slaughter, in some places exemption being made for very young animals. In Northern Germany the conditions have not been the same, obligatory meat inspection having been required in some parts, including Berlin, and not in others, examination for trichinosis alone having been practically general. In Brunswick and Saxony, since 1898, however, meat inspection has been obligatory throughout, the law being very similar to that of Belgium. Now the law of 1900 requires that, throughout Germany, neat cattle, swine, sheep, goats, horses, and dogs—the meat of which is intended to be used as food for man—shall be subjected to an official inspection both before and after slaughter, and by decision of the Federal Council the obligatory inspection may be extended to other food animals.

In Sweden and Norway there have been laws requiring the provision of communal slaughter-houses since 1892, and in 1895 requiring meat inspection in the towns. Public slaughter-houses have, however, not been provided. In Norway there is at the present time, Dr. Bentzen informs me, only one public slaughter-house, viz., at Christiansund; and in Sweden, I learn from Dr. Linroth, there is no public slaughter-house, but they are now proposed in Stockholm and Gothenburg and a few smaller towns. In Denmark, Professor Ostertag states that, in 1899, there were public slaughter-houses and meat inspection in seven towns. In Austria-Hungary, he says that the law requires the inspection of slaughtered animals, but the method of administration had prevented uniformity of action. In Italy, he writes, a good scheme for meat inspection became law in 1890, but the regulation of meat being left to the provincial authorities has made a thorough reform impossible. The law requires the inspection of all animals intended for the food of man, the

erection of public slaughter-houses in towns of more than 6,000 inhabitants, and the stamping of meat, including inspection of imported meat.

It is thus seen that already there is obligatory inspection of meat in some countries and that other countries are adopting the same course. I am not exaggerating the position if I say that the trend of opinion and of law in civilised Europe is to require that meat intended for human food shall be inspected by competent persons before it is sold for this purpose. All countries are not equally advanced in this matter, delay being often caused by the want of provision of the one condition which is essential to the carrying out of this intention—the provision of public slaughter-houses.

I need not point out the absolute necessity of this provision, if effect is to be given to the recommendations of the Royal Commission on Tuberculosis or to the requirements of laws which have been adopted in other countries. So long as animals may be slaughtered in numerous private premises in our cities, inspection cannot be carried out. The inspector must be present at the time of slaughter, so as to ensure that regulations as to what is to be deemed fit for food and what is to be deemed unfit for food shall be complied with, and to prevent the dishonest butcher practising those arts which give to meat a fictitious appearance and which are well known to those who have experience of meat inspection.

This is becoming generally recognised, and in Prussia, Professor Ostertag tells us, public slaughter-houses have, in the last twenty years, "literally grown out of the earth"; so much so, that in 1897 there were 321 public slaughter-houses in that kingdom, and forty were provided in the period 1895–7. This provision is, of course, required for other reasons than those which relate only to the prevention of tubercular disease in man: but we may here claim that it is absolutely necessary on the score of the disease which this Congress is especially considering.

It is the want of public slaughter-houses which stands in the way of effect being given, in some of the Continental countries, to their law of obligatory meat inspection; it is the opposition to public slaughter-houses on the part of the butchers which is the chief obstacle to the institution of a system of meat inspection in this country.

I may, therefore, briefly refer to the objections which have been urged by the butchers' trade to the replacement of private by public slaughter-houses. One of these objections is that the price of meat would be increased. The effect in Germany of the system of slaughter in public slaughter-houses and of meat inspection has been carefully considered by Osthoff, who came to the conclusion, in 1894, that the cost of the administration represented a sum less than about one-half a farthing in the pound of meat. This is obviously a price of no practical importance when considered as a set-off against the advantage of the exclusion from sale for human food of meat which is now unfit for the purpose. Dr. Schwartz, director of the town slaughter-house and cattle-market at Stolp, however, writing later, says: "The fear whether such establishments [public slaughter-houses] would pay or possibly cause an increase in the price of meat has been found to be quite

groundless, and has long been disproved. That this latter cannot be the case is conclusively proved by the experience of many years which individual communes possess; on the contrary, one may rather maintain that the prices have gone down, since the quality of the meat has improved, but the price has remained the same, apart from the general rise in the prices of food."

It has also been urged that the meat killed in public slaughter-houses would be less well cared for than the meat killed in private slaughter-houses. Such argument would not be used by those alike familiar with the procedure in public slaughter-houses on the Continent and of private slaughter-houses in this country. Compare for a moment the difference between the opportunity given for slaughter in a well-appointed slaughter-house fitted with every convenience and with cold chambers, to which the carcases are removed, with the opportunity which exists in the small outbuildings and sheds in the rear of private houses in an English town. It has been urged that the offal which is consumed by the poor would be lost if the animal be slaughtered in a public slaughter-house. This, again, the experience of the public slaughter-houses of the Continent shows, has no foundation. It has been urged that the butcher who has a private slaughter-house is able to employ his men at one time in slaughtering, at another in his shop or calling for orders. There is no reason why, if the butcher prefers it, they should not be equally employed in the public slaughter-house as in the private slaughter-house. It has been urged that, if there were no private slaughter-houses, there would be risk of a "ring" being formed to the detriment of the public. Obviously the best safeguard to the formation of a ring is to give to everyone selling meat the opportunity to slaughter his own animals. At the present time in London only a small proportion of meat vendors have private slaughter-houses, and the rest depend, in the main, upon the middleman.

It has been urged that the effect of the replacement of private by public slaughter-houses would tend to the exclusion from the meat market of English-grown cattle. Obviously, so far as London is concerned, the result would be the opposite, for every meat vendor would be able to purchase his own meat alive, instead of depending upon middlemen, and could purchase what cattle he liked. I am satisfied that the use of the public slaughter-house is directly in the interest of the butcher, who would save in expense, and who would be able especially to save, by using the meat-cooling chambers associated with it. I recently made some inquiry as to the cost in London incurred by London butchers in providing ice for their ice-safes in hot weather. The amount is enormous, and for this the public has eventually to pay in the price of the meat they purchase. It has been urged that public slaughter-houses will be a charge upon the public purse. This again is not in accord with Continental experience. At the time when the second Royal Commission on Tuberculosis was sitting, several of its members, including its Chairman, visited a number of public slaughter-houses on the Continent, and reported that "all the public slaughter-houses in Germany are self-supporting." Professor Ostertag tells us that a Commission in Saxony, appointed in 1893,

investigated the subject of the finances of public slaughter-houses. They reported that, "As soon as the project [the establishment of a public slaughter-house] is mentioned, the butchers (the traders most interested therein) almost always oppose it, fearing various inconveniences to which their trade may be subjected in connection with a public slaughter-house and its compulsory use, not the least of which is the stricter control of their business which comes with a public slaughter-house. Added to this, they raise the question of cost, and they hold out prospect of an increase in the price of meat, a fact which carries weight with the public and with the representatives of the community. But if public opinion is not influenced by this opposition and by these fears of the butchers, and if the leading citizens are of opinion that a slaughter-house is necessary, the butchers almost always abandon their opposition suddenly, recognise the necessity of a slaughter-house, and at the same time demand the right to build, arrange and administer it themselves."

"Apart from other reasons not necessary to discuss here, the finance question is placed in the front rank by the butchers. While they seek to attack the citizen on his weakest side, the not inconsiderable cost of building, arrangement and administration of a public slaughter-house is unduly brought forward by the butchers, and the prospect is held out of a heavy charge on the finances of the town, increased taxation, etc. It is important to emphasise that the establishment of a public slaughter-house is in no way prejudicial to the finances of a town or increases the taxes of the citizens, but that the funds devoted to the building and management are a very good investment. This the butchers' guilds and other persons who offer to build slaughter-houses know very well, and with this reason strive with all their might that this favourable financial project shall not escape them. But in this financial matter the local authority has a predominant interest."

The Commission states that the receipts, without burdening the trader with heavy fees, provide, after payment of expenses, an interest of from five to six per cent., as well as a contribution to a sinking fund, which will extinguish the debt in from thirty-five to forty years.

I have dwelt upon this financial question at some length, because only a few years ago London went through the first phase which the Saxony Commission describes.

In England, therefore, we must, if we are to prevent the sale of tuberculous meat to the public, provide for and insist upon the slaughter of all animals intended for food in public slaughter-houses, and we must provide competent meat inspectors for that purpose. The question has to be considered to whom shall this duty of meat inspection be entrusted. It is perfectly clear that the work must devolve upon those who have a knowledge of pathology, and this at once narrows the question down to the selection of members of one of the two professions having such knowledge—the medical and the veterinary. I do not think that in this country we shall ever relieve the medical officer of health of the duty of determining what is to be deemed fit for the food of man, nor is it desirable that this should be done; but in the actual carrying

out of the work I believe we should do well to enlist, much more than we have done in the past, the services of members of the veterinary profession, and that we shall find that as they qualify themselves for this special duty they will be able to serve the purpose we have in view.

In conclusion, then, I may say that the time has fully come when we should follow the excellent example which has been set us by other countries, that we should require all the animals which are killed in urban districts for human food to be slaughtered in public slaughter-houses, where there can be inspection before, at the time of, and after slaughter of the animal, that the meat shall be stamped, and that the public should be taught to look for this stamping as the test of wholesomeness rather than have to rely upon the pathological knowledge of the butcher and the housewife. Further, that all meat which has been killed outside a district, other than that which may have been killed in some public slaughter-house, and which bears the evidence of inspection, shall be taken to meat inspection stations for examination.

Greater difficulty no doubt attends the inspection of meat in village communities, but even in such sparse populations the veterinary surgeon is to be found, and it is quite possible to organise a system by which his services are available when animals are killed for food.

We are not now concerned with any question of other disease than tuberculosis, but I may refer to the enormous gain it would be to the community to exclude from the human food supply the meat of diseased animals, which now can, practically without let or hindrance, find its way to the consumer. It would prevent, what has been within my own knowledge, meat from a knacker's premises being sent to London from the provinces; it would ensure to the poor people among us that in purchasing meat they were receiving the value of their money.

It would, however, do much more than I have stated, and especially in respect of tuberculosis, for in closing the door to the ready disposal of the meat of tuberculous animals, it would compel the stockowner to take steps to prevent the infection of his herd and would lead to the earlier exclusion from the milk supply of animals manifesting symptoms of tuberculosis, for the interest of the cow owner would be to slaughter them before disease became advanced.

I beg to move—

That, in the opinion of this section, the meat of all animals intended for human food should be inspected before being sold for that purpose, and that in all urban districts, and in all rural districts as far as possible, such animals should be slaughtered in public slaughter-houses, so as to ensure efficient inspection.

A DELEGATE: Is Dr. Murphy here, or does he intend to be here?

The PRESIDENT: Dr. Murphy told me yesterday that he had to go somewhere else on the public service, and that it was exceedingly unlikely that he would be present here this morning.

MEAT INSPECTION AS CONDUCTED BY THE MUNICIPAL CORPORATIONS OF THE CITIES OF BELFAST, PARIS, AND BERLIN, AS A MEANS BY WHICH THE SPREAD OF TUBERCULOSIS IS PREVENTED.

By Councillor HENRY O'NEILL, M.D., J.P., *Belfast.*

Meat inspection in Belfast is conducted under the control of the Market Committee of the County Borough by the Inspector of Meat and Provisions. The staff consists of one superintendent of the public abattoir, and three practical meat inspectors. When any doubt arises as regards the condition of the meat inspected, there is a consultation held with a veterinary surgeon and such other experts as the Market Committee may consider necessary.

The powers of these meat inspectors are defined by Clauses 116, 117, 118, and 119 of the Public Health Act, 1875, and the Belfast Borough Act of 1845.

Each inspector of meat and provisions has been thoroughly trained in the slaughtering of animals, the preparation of meat intended for human food, and the characteristic appearance of:—

1. Diseased Meat.
2. Meat from animals dying through accident.
3. Putrid meat.
4. Physicked meat.
5. Dysenteric meat.
6. Fishy meat.

It is equally his duty to prevent sound meat from being destroyed, as it is to see that all unsound meat is promptly destroyed.

It is well known that large quantities of diseased meat are sold for human food, and especially by the poor is this unsound meat purchased and used, as they have not always the means of knowing sound from unhealthy meat, when the latter has been skilfully prepared by dishonest butchers for the purpose of making money at the expense of the health of the public.

Much diseased meat is taken to manufactories, where various kinds of minced meats are made, such as German sausages, pork or meat pies, brawn and other delicacies, highly seasoned to cover any imperfections in quality.

On the 1st September there was submitted a report on "Meat Inspection" as conducted by the municipal corporations of Paris, Berlin, London, and Manchester. On the 15th September, 1900, this report was considered, and was adopted and entered on the minutes, and the following resolutions were unanimously adopted:—

Resolved—"That our inspectors be instructed to stamp each carcase of meat passed by them as fit for human food, if the owner consent to their doing so."

Resolved—"That the Council be recommended to pass a bye-law to the following effect:—

"'That all meat killed outside the city and brought into the city for sale, shall, before being sold or exposed for sale, be brought into a market to be appointed by the Council for inspection by one of their inspectors of pro-

FIG. 1.

FIG. 2.

visions, between the hours of 8 A.M. and 10 A.M., and shall not be sold or exposed for sale until after same has been inspected and passed by him as fit for human food. Penalty not exceeding 40*s*.'"

This bye-law was confirmed by the Local Government Board on the 9th February, 1901.

COUNTY BOROUGH OF BELFAST.

MARKET DEPARTMENT.

RETURN:

Showing the number of cattle slaughtered in the public abattoir, examined there, and also in the public meat market, and seized from being affected with tuberculosis:—

IN THE PUBLIC ABATTOIR FOR YEAR 1900.

Number slaughtered	20,841	Number seized	170

From January 1st till June 30th, 1901.

Number slaughtered	9,134	Number seized	66
Total for 1½ year, slaughtered	29,975	Total seized	236

IN THE PUBLIC MEAT MARKET.

From April 1st till June 30th, 1901.

Number of carcases examined	346	Number seized	1

Advice to the Citizens of Belfast.

Before purchasing meat from your butcher ask to see the mark of the Meat Inspector's stamp on it. When the meat has been stamped (see Figs. 1 and 2) the purchaser may be certain that, under the direction of the City Corporation of the County Borough of Belfast (the first city, we believe, in the British Isles to adopt a scientific method of such inspection of meat), it has been carefully examined, and declared sound and fit for human food.

PARIS.

In Paris a strict method of inspection is adopted in the examining of all meat brought to the city, whether killed at home or foreign, and when the meat is found to be sound is stamped with a stamp bearing the signature "P. P.," which means Prefecture of Police.

At the International Congress of Hygiene and Demography in Paris, 1900, the following resolutions were passed :—

"That all tins containing preserved meat, fish, etc., should bear the date of their manufacture; and that rules for the preservation of food in tins should be published and distributed among all persons engaged in the trade.

"That no chemical should be employed for the preservation of food.

"That the inspection of meat should be enforced, and the methods of control assimilated in all countries. It was recommended that an International Congress of Veterinary Surgeons and others should meet for this purpose, so as to establish a basis for uniform teaching in all countries as to the methods of controlling the meat supply.

"That there should be public slaughter-houses in all large centres. That small centres should federate so as to have one public slaughter-house between them.

"That where it was absolutely impossible to have slaughter-houses, the killing in private slaughter-houses should only take place at fixed hours, and should be under the control of the local authorities.

"That inferior but wholesome meat might only be sold in especially indicated localities, and inspectors should have the right to visit all such places, both day and night."

BERLIN.

In Berlin all cattle to be offered for sale in the city must be brought to the public abattoir, and the slaughtering of cattle anywhere else in the municipal boundary is absolutely forbidden.

All dead meat, slaughtered in the country or abroad, and intended for human food in the city, must be brought to the public abattoir and meat market for inspection before being offered for sale as human food. No butcher in Berlin may offer meat for human food which does not bear the

official stamp of the inspecting department of the central market. About 1,100,000 animals are slaughtered annually in Berlin.

The chief inspector of meat is a thoroughly qualified veterinary surgeon, and has under his control a large staff of surgeons, assistant surgeons, special inspectors, and stampers.

As a result of this method of thorough inspection, as conducted under the control of the Municipal Corporation of the City of Berlin, a person may purchase meat from any butcher's shop in the city, and feel certain the meat has been carefully inspected, stamped, and officially declared fit for human food.

The cattle dealers and butchers of Berlin appear to be well satisfied with the working of the present system of meat inspection, and would not care to have a less stringent measure adopted.

Mr. H. COGGAN (National Federation of Meat Traders' Association): Before Dr. O'Neill leaves the platform I should like to ask him one question. He has told us that he is familiar with a locality where a great deal of tuberculous meat has been consumed, and, therefore, I take it from what he has said that he is a much greater authority than Dr. Koch on the subject. I would, therefore, like to know whether he can put his finger on a single case where tuberculosis has been communicated to man through the eating of this tuberculous meat with which he is so familiar.

Councillor O'NEILL: In answer to the question, I can only say that I know of no case that I could prove by pathological examination, but I do know as a medical man that in the crowded districts of our cities where the poor live tubercular diarrhœa is a very serious danger and a very real cause of the death of children. In a city like ours it would be very difficult to have a careful inspection after each death and try to find out if the individual died of tuberculosis; it is very hard to get scientific examination of the poor after death except in hospitals; but I am thoroughly convinced in my own mind from careful observation that tubercular meat made into beef tea—you know how beef tea is made—that the juice of tuberculosis from the cow gets into it, and no matter what Dr. Koch says, I for one would not like to give it to my child, and I should oppose anything tuberculous being given to any of my patients. (Cheers.)

Sir CHARLES A. CAMERON, M.D., C.B., *Dublin:* Mr. President, Ladies and Gentlemen,—I have great pleasure in supporting the resolution which has been proposed on behalf of Dr. Murphy and seconded by my facetious countryman from the north of Ireland. I believe that at the present time there is not a sufficient inspection of animals used as human food in a very large proportion of the towns of the United Kingdom, and I believe that the inspection such as has been proposed by Dr. O'Neill, of Belfast, cannot be very effectively performed in any of those large towns of the United Kingdom until the abattoirs are under the control of the municipal authorities. Dealing

with my own city of Dublin, of which I have had a considerable experience for many years with regard to the inspection of animals used as human food, I find that it is an utter impossibility that there can be an efficient inspection, seeing that although there is a public abattoir quite capable of affording accommodation to all the butchers in the city, yet there are no fewer than forty private slaughter-houses in the city. Some of those slaughter-houses, no doubt, are very well equipped for their purposes, and they can hardly be condemned, many of them, upon purely sanitary grounds, but at the same time, unless there is an extremely large staff of skilled inspectors, it is quite impossible that an efficient inspection of the animals can be carried on in forty of these establishments, seeing that the slaughtering is generally confined to a couple of days a week, and nearly always at the same time. With regard to the inspection, such as it is, very curious things have been ascertained. I have myself seen an animal extensively affected with pleuro-pneumonia, a disease which, happily, by preventive measures, has been completely wiped out in Dublin during the last four or five years, after existing there since the year 1842. In inspecting animals, all kinds of tricks have been found out. I remember many times when an animal suffering from an advanced stage of pleuro-pneumonia was slaughtered, and at the time of inspection the lungs belonging to a healthy animal had been put into the carcase, but I generally found that the temperature of the lungs was very different indeed from the temperature of the carcase. Cold lungs were often found in warm carcases, also animals can be sent into all these slaughter-houses in a condition in which they certainly would not be passed if they were sent into the public abattoir. All kinds of tricks have been used in Dublin from time to time to bring in animals that have died or been killed accidentally in country parts, so as to escape the vigilance of the police and the sanitary inspectors. Not very long ago a body of an animal was brought in in a vehicle that was intended for the bodies of very different people, namely, in a hearse. That actually took place not very long ago. Of course it was done for the purpose of deceiving the police and the sanitary authorities who examine the carts which bring in the animals that have been killed in the country. The medical officers of health, I know, are very jealous as regards any veterinarian interfering with them as regards the pronouncing of an opinion as to the fitness of the carcase of the lower animals used as human food, but I venture to think that any medical officer of health of a large town would not at all object to having on his staff a skilled veterinary surgeon. I have succeeded lately in inducing the corporation of Dublin to add to its sanitary staff a very experienced veterinary surgeon. A portion of his time is now devoted to carrying on his duties under the provisions of the Contagious Diseases Animals Act, which is a distinct Act, and his services are also employed very largely in the examination of the animals that are slaughtered in the private slaughter-houses. He is also employed in examining the cows in the dairy yards in the city of Dublin. I venture to throw out the suggestion that in all the large towns a systematic inspection of the animals which are kept in dairy yards, many of which are fattened after the first year and sent to the slaughter-house, should take place.

It is an unfortunate circumstance that under the provisions of the first Sanitary Act of 1848 and some of the amending Acts, that private slaughter-houses cannot be abolished without compensation unless a new abattoir is established under the control of the municipality. It is a most desirable thing that some means should be adopted to enable the sanitary authorities to acquire an interest in these private slaughter-houses with reasonable compensation. Of course, I am greatly averse to confiscating an interest, however humble it may be, without due compensation, but I think these two things are wanted: a means of compensating the owners of private slaughter-houses in all places where abattoirs are established, and also a means of compensating the *bonâ fide* purchasers of animals—that some compensation should be given to those who purchase animals, if they can show that they bought them at a proper price, but not, of course, if they purchase them, as they sometimes do, for a mere trifle. I have great pleasure in supporting the resolution, and I do hope that the system which has been adopted in Belfast may be carried out in all the larger towns of the United Kingdom. (Cheers.)

Dr. HIME, *Bradford:* If any of the distinguished Continental visitors, who have honoured us by their attendance at this London Congress, have been in any way disappointed during their stay among us (which I hope is not the case, as I know how very welcome they are), there is one thing which I venture to think should afford them the greatest possible satisfaction by way of compensation. It is to see how enthusiastically we in England are joining in the crusade against tuberculosis, which has been rendered possible only by their brilliant and extensive discoveries as to the pathology of that disease—the most terrible of all, whether we regard merely the number of its victims, or consider also the stealthy, slow, gradual process by which it kills its victims, as it were, piecemeal. England may fairly claim to have been the great leader in sanitary reform, in the war against dirt, in the construction of sewers and drains, in filth removal, water supply, dealing with infectious disease, and other problems of public health, which depend largely on sound judgment and not on exact scientific research. In all departments of pathology, which depend on biological research, we feel we are behindhand. We regretfully admit that we so are handicapped by false, illogical prejudice, and obstructive legislation that we are obliged to act on the results obtained by foreign investigators, who can work untrammelled for the relief of mankind and of animals from the attacks of the deadly agents of disease. We recognise the great value of their researches, and gladly are guided by them. Without such biological research the illustrious Koch could never have revealed to us the cause of tuberculosis; we could never have known where lay the enemy who caused its fearful ravages, and this Congress, held to enlist the co-operation of all humanitarians in destroying the destroyer of so many lives, could never have been held. Biological research and vivisection alone have rendered this crusade against tuberculosis possible, and justified the great hopes we feel of a brilliant victory over the disease. In England we have been able to reduce the mortality due to phthisis by 36 per cent. since the

decade 1851–60. If this has been done entirely by improvements in general sanitation, and in the general condition of the people, while no effort has been possible to deal with the unknown source of tuberculous infection, what splendid results may we not look for in future? Now we can deal with the specific virus—we can fix, isolate, and destroy the sputum, the great source of infection; we can prevent the spreading broadcast of that deadly virus; we can save children from cruel sacrifice at the hands of their infected parents, and interfere to prevent unsuspicious persons becoming tenants of houses infected by tuberculosis, until they have been rendered healthy and safe.

This splendid vista has been opened to us by the experimental researches of Koch, Baumgarten, Nocard, and a legion of other indefatigable workers. And if the results attained have necessitated the sacrifice of guinea-pigs and rabbits, even if they had necessitated the extermination of the whole race of guinea-pigs, are they not well worth the sacrifice in the saving of life and suffering among man and animals? The question of infection by the use of meat from animals which have suffered from tuberculosis is one which, from a pathological point of view, is of very secondary importance. Still it requires attention as regards a possible source of disease, and also from an economical point of view. It is established beyond a doubt that tuberculosis exists largely in our herds of cattle, and the best authorities say its prevalence is increasing. It is equally true that meat is eaten far more generally and largely by the people of this country within recent years than ever before, while the Registrar-General demonstrates that decade after decade tuberculous disease is diminishing among us. Along with these facts we must take the general custom throughout the country. That it is but a very minor factor is proved by direct experiment. For example, the experiments performed for the Royal Commission on Tuberculosis in this country showed that meat taken from sixteen cows with "mild" or "moderate" tuberculosis, that is, with localised tuberculosis, and given uncooked to very susceptible animals, had failed to infect one of them. Even when meat taken from animals with "generalised tuberculosis"—that is, who were entirely infected and were fatally ill—was eaten uncooked by highly susceptible animals, it only infected some of them. Such meat would, of course, not be allowed to be sold for food in any market. It may be added, man enjoys great resisting powers against tuberculosis as compared with guinea-pigs or rabbits, and he does not eat his meat quite raw. Further, we know that tuberculosis is very prevalent among cattle, and eminent authorities say it is becoming more so. We eat far more meat now than our forefathers, and yet tuberculosis is greatly declining. Again, tuberculosis of the digestive organs is least prevalent just among those age-groups who eat most meat, and is most prevalent amongst children, no doubt owing to their consuming uncooked, tuberculous milk. The general practice throughout this country is to allow carcases with localised tuberculosis to be sold for food, indeed I believe there is not nearly sufficient care in preventing the sale of carcases quite unfit for food. There are a few medical officers who are a law to themselves,

and declare that if the minutest speck of tubercle exists in a carcase the whole must be destroyed, and the owner punished according to law, by fine or imprisonment. In no other country in the world is such a thing allowed. It only exists here, not by law, but rather through the want of law to prevent the eccentricities of a few individuals being carried out so as to inflict grievous wrong. No wonder the Royal Commission states in its Report (1898, par. 25): "That some limit should be observed in the latitude allowed to medical or veterinary officers in fixing independent standards of soundness in different places," and further that they "entertain no doubt that in certain places a great deal of meat is seized which is perfectly safe and wholesome food." We must remember that such seizures of "sound and wholesome food" generally imply disgrace, loss of trade, prosecution, fine, or imprisonment, not to speak of the misery and distress inflicted on a respectable owner.* Three parties are concerned in seizure and condemnation of meat, viz., the magistrate, the official of the sanitary authorities, and the person responsible for the meat, who for brevity may be termed the owner, though other parties may be also responsible. Any medical officer of health or inspector of nuisances has the power to inspect articles of food exposed for sale, or deposited in any place for the purpose of sale, or of preparation for sale, and intended for the food of man, and, if they appear unfit for food, they seize the articles, and carry them away to be dealt with by a Justice, and, if they appear unsound to the Justice, he may order the articles to be destroyed. By a later enactment the power of seizure is much extended. But what of the owner, or party in possession, during these proceedings? Strange to say, no account whatever is taken of him. The articles may be inspected, seized, carried away, condemned and destroyed, without the owner being communicated with, and in his absence. He may know nothing of what has taken place until after the destruction is complete. The Justice in condemning the articles is not required to hear skilled evidence, or any, to prove the food is bad. He is supposed to condemn on his own judgment; but he may hear evidence—indeed, when asked to inspect the food, which is usually done in the form of a request by the officials that he will inspect it with a view to condemnation, the Justice has *prima facie* evidence, tendered *ex parte*, that the food is bad, and he necessarily has this in his mind when he proceeds to examine. Probably in every case, when making his examination, he asks the opinion of the officials as to the quality of the food. In the absence of the owner this is entirely a one-sided affair, and not satisfactory. Either no evidence at all should be taken, or it should be taken fairly. Obviously it would be impossible to have a detailed and formal trial in the slaughter-house, or wherever the carcase is being examined, with legal advisers and cross-examination. But is the Justice qualified to judge of the quality of meat, and say whether it is tuberculous, and unfit for food, without evidence? In the vast majority of cases he is not. He has usually no

* To avoid circumlocution the word "owner" is used here, and in many other places, to designate the person responsible, the defendant where the case leads to prosecution.

knowledge whatever of the subject, and in some cases when proceedings for wrongful seizure and condemnation have been taken, the Justice who acted has frankly admitted he knew nothing about the disease, and that he acted on the advice of the officials. Officials may be wrong—they have been proved to be wrong, and compensation has had to be paid for the wrong done by them, and in some rare cases they have admitted they were wrong. Therefore, it cannot be regarded as satisfactory that such a serious step as condemnation and destruction should be taken on the *ex parte* statements of an official made to a magistrate who is ignorant of the subject and incapable of deciding on proper grounds. Officials are human, and, besides being liable to mistake tuberculosis, they may be vicious, and may act from some improper motive. Magistrates are not appointed in this country because they possess learning or technical knowledge of meat or of anything else, but for social and other similar reasons. To make a successful tinker or tailor into a magistrate is easy, and often done, but to authorise such to act as a specialist in diseases of animals is very wrong. The owner is entitled to protection against this injustice. The owner has no distinct right to call skilled evidence to demonstrate to the Justice that the meat is good, and obviously this may be necessary. Further, the owner, convinced his carcase is sound, may demand opportunity for skilled witnesses to inspect the carcase, with a view to his giving evidence in proceedings which he intended to take for improper condemnation. This elementary right may be, and has been denied, and the officials have deliberately destroyed a carcase without allowing any person to inspect it with a view to giving evidence as to its state. I think no candid person will defend this. The medical officer and the inspector of nuisances, as the parties authorised to inspect, seize, and carry away a man's property, should obviously have special knowledge of the diseased condition in question, and everyone will agree that when a charge is brought against a man in such a question, he should be informed of what he is to be accused, so as to prepare his defence. He must under our law be held innocent until he has been proved guilty. The seizure and destruction of the carcase does not prove the man guilty. That must be demonstrated subsequently in open court, and on sworn testimony. The seizure and condemnation has been effected in private, and without any formal evidence, or on none at all. But there is no legal obligation to tell the man the exact nature of the offence he is alleged to have committed, and in practice this is not usually done. He is vaguely charged with having sold "unsound meat." This is as if a man were being charged with being dishonest, without any particular act of dishonesty being stated against him. Under the Sale of Food and Drugs Acts the exact nature of the adulteration, alteration, etc., of the articles of food must be stated by the analyst. It is but just that when a man is accused in reference to diseased meat the charge should specify what the disease is, and that in the case of tuberculosis, for instance, microscopic evidence should be produced in support of the charge. Such microscopic evidence could then be tested by the defendant. Though the summons merely states that the meat was vaguely "unsound," when the case comes into court the prosecution has to

state the exact nature of the unsoundness. Thus it is sprung on the accused as a surprise. He may have engaged specialists who could prove the carcase was not affected with tuberculosis, which was perhaps spoken about at the seizure, but his efforts in self-defence may be rendered entirely futile on hearing for the first time in court that the animal had not tuberculosis, but suffered from anasarca, or inflammation, or some entirely different affection. I know of a case in which a carcase was seized and destroyed as being affected with tuberculosis. I was consulted about it, and found it was not tuberculosis, and an eminent pathologist, consulted by the sanitary authority, also said it was not tuberculosis. Thereupon the owner proceeded for compensation, and to everyone's surprise, the sanitary authority dropped the charge of tuberculosis, and stated the animal had inflammation of various parts. They were condemned to pay compensation and costs. But the struggle was hard, very costly, and, as all here will admit, unfair to the owner, whose character was at stake as well as his money. The incapacity of the ordinary Justice to judge of whether an animal has tuberculosis or not, and whether to such an extent as to render the carcase unfit for food, will be obvious from what precedes. But what of the officials? Any registered medical practitioner is eligible for election as a medical officer of health, and a person who is not even a medical man is eligible as medical officer of health for a county, under Section 18 of the Local Government Act of 1888. No special proof of knowledge of sanitary science or of diseases of animals is required. Of 1,299 medical officers in England and Wales, outside the metropolis, there are only 174 who have a diploma in public health, indicating they have qualified themselves for their important work. And the election of all of them is approved by the Local Government Board, and some of them are paid half their salary by that Board. Is it to be expected that when a private practitioner, who has never been trained in the science of public health, consents to accept £5 or £10 or £20 a year and the post of medical officer of health, that he thereupon enters on a competent knowledge of his work, and his diagnosis of tuberculosis in meat should become trustworthy? Yet such an officer has it in his power to inspect, seize, and carry away and get destroyed a carcase which he, without competent knowledge, says is "unsound"—and he can get the owner fined or imprisoned. The other official who enjoys this important power is the inspector of nuisances. He divides his time between the emptying of ash-pits, street sweeping, inspecting drains, etc., and the scientific inspection of meat. By law no qualification whatever is required—not even one of sex. Any man or woman, however uninstructed in the duties of the post, is eligible, and many most unsuitable persons are elected. I know a bricklayer and a carver of gravestones who have been appointed. The former was responsible for seizing the tuberculous carcase I referred to, which turned out not to be tuberculous, though it was destroyed. The Royal Commission tells us of a compositor, plumbers, carpenters, stonemasons, florists, and even tram conductors who are meat inspectors and authorised to inspect, seize, and carry away. I fear they pass over far more objectionable carcases than they condemn, for they must be conscious of the difficulty they would be in if they

had to prove a case. Is it not obvious that trained experts alone should be armed with the great power and the important duties of the meat inspector? The fact that our Government acts so largely by *laisser faire*, and that the question of *saisie totale*, which on the Continent is by law prohibited where tuberculosis is localised, is here left entirely to the medical officer of health, naturally results in there being found among that body a few who are a law to themselves, and who, disregarding the results of experiment and experience, and the enactments of all Governments which have a law on the subject, as well as the opinion of our own Royal Commission and of the Local Government Board, declare they will not allow meat to be sold from an animal in which there is the smallest nodule of tubercle. Ignoring the familiar fact that tuberculosis begins as a local disease in man, and that every day such tubercular glands and the loose lesions are cured by removal, they declare that localised tuberculosis is a fable invented by ignorant and wicked persons—this will be found in the annual report of a medical officer who until recently acted for one of the most important districts in England, or in the world. Ought not the Government to protect the public and meat dealers from such a free-lance? All around him are medical officers who pass carcases with localised tuberculosis: but here stands one, like Athanasius, *contra mundum*, who will only act on his own completely ignorant opinion. The Local Government Board has issued model regulations, which they have instructed sanitary authorities to "direct" their officers to follow—they are the recommendations of the Royal Commission on tuberculosis, authorising the passing of meat when tuberculosis has been localised. But their model regulations are a dead-letter. I would suggest that every medical officer of health, part of whose salary is paid by the Local Government Board, should be required to act on these regulations as a condition of his appointment. The regulations, though by no means perfect, are a fair statement of the position, and are in accordance with our knowledge of the pathology of tuberculosis, as far as they go. This would introduce something like uniformity, and on a well-established base, where all is chaos. Considering how severe the penalties are which may be inflicted, on the other hand it is but reasonable that if an animal, apparently in good health, and for which a good price has been paid, is found on slaughtering to be tuberculous, and if the disease is not in a stage which can quite be brought within such regulations as may be agreed on as governing localised tuberculosis, some fair compensation should be allowed. Fair dealing is all that is asked, and nothing else should prevail. When a man has paid £23 for a beast, with a veterinary certificate of healthiness, and the carcase is found to be tuberculous (as in the Glasgow case), he should not be treated like the man who buys a beast in the last stage of generalised tuberculosis, for one or two pounds, kills it to prevent it dying, and then sells the meat to an unsuspecting public.

Dr. MARSDEN, *Birkenhead:* Mr. President, Ladies and Gentlemen,—In a case of this kind it might not be impertinent on my part, as the medical officer for Birkenhead, to say a few words on this question of the inspection of meat for

tuberculosis. The point down on the paper for discussion is the preventive measures which must be taken for the inspection of tuberculous meat, and to that question alone I intend to confine myself. There is no question of doubt that we meet to-day under a cloud such as medical officers of health of this country have not known within my recollection. How far that cloud is going to influence the action of sanitary authorities and medical officers of health in their duties as inspectors of tuberculous meat is the one which now becomes the question of the day in connection with a meeting of this kind. It seems to me that Dr. Koch has undoubtedly thrown a bomb amongst us which it will take a very long time to eradicate, whether his assertions are right or wrong. For my own part I receive any statement from Professor Koch with the greatest and profoundest respect, and I must consequently be influenced in my judgment by the expression of opinion from such an authority. (Hear, hear.) But I am not satisfied, as Lord Lister also told you yesterday, that the matter is yet proven, and until we have got the necessary proof I do not think we shall be justified as sanitary authorities in upsetting the system of procedure which we have taken up to the present time. I have never been one of the extremists in the inspection of tuberculous meat. I do not know any medical officer of health such as Dr. Hime describes. (Dr. Hime: "The City of London last year.") I do not know them. In the whole of my experience I have not known one, and certainly it is not a course which I myself have taken. It is no use discussing the question of whether public abattoirs are desirable or not. That, I take it, has been decided long ago, and the desirability of public abattoirs is absolutely incontrovertible from the public health point of view. ("Question.") I am not speaking from a butcher's point of view, but from the public health point of view—(hear, hear)—and consequently I do not think it is worth while to waste our time discussing that subject. The only question is that I think the public abattoir system should be extended to rural districts as well. I discussed that matter before the Royal Commission, and my views on the subject are put down in the Royal Commission's report as to the method by which I would attempt to carry it out. With regard to inspection, the question is, "What administrative powers are you going to take to procure the adequate inspection of tuberculous meat?" There is where the great difficulty comes in under the present law, when you have your public abattoirs. I have public abattoirs in my own borough, and there are public abattoirs in every town in England; but where is the difficulty? In one of the largest abattoirs, in which I have to deal with the offal and the organs, they are taken entirely away from the carcase, and you have to judge of the carcase as it stands. It is all very well to look at a carcase. If it is badly diseased with tuberculosis on the surface, every butcher and everybody else can tell it; but where it is not affected by tuberculosis on the pleura and peritoneum, or on the superficial surface, how are you going to tell it then? I have seen many hundreds of carcases in my time which have been affected with tuberculosis in the glands, and showing no signs of tuberculosis on the pleura and peritoneum. The majority of respectable butchers will give you every facility to examine that carcase if you

express the wish to do so, and with those gentlemen you have no difficulty; but there is always a rag-tag and bob-tail to every trade and profession, and those are the ones that give you the difficulty. The only way to protect the public is to give the medical officer of health absolute power to cut to the glands if he considers necessary. I do not say that any respectable butcher will not allow him to do it, but if he will not allow him, he ought to have the power, so as to satisfy himself of the absolute clearness. Dr. Hime has talked about generalised and localised tuberculosis. If there is any one fad or freak which is ill-used, it is that question of localised tuberculosis. If you are going to use the term at all, then a definition of what localised tuberculosis is ought to be distinctly laid down by statute. I heard a gentleman in court not very long ago describe a carcase which was riddled from end to end in twenty-six glands of the body in different parts, as a case of localised tuberculosis. Localised where? Localised in the glands. I say it is a crime that that should come within the term of localisation. It is certainly localised in the glands, but the glands are localised in every part of the body, and you could not deal with that as meat without having those glands in the meat. Therefore if you are going to use the term "localised," you must give a term of what localisation means. I understand by localisation a particular patch limited to a small area, which can be cut out, and so allow the rest of the carcase to pass as absolutely free. That is my idea of what localised tuberculosis is, and such action I take constantly in the course of my practice. There is a great tendency to advocate the German system of expert examination in this country. I do not think that the municipal authorities of this country are prepared to undergo the enormous cost which that entails as an administrative principle. I think it is sufficient for all practical purposes if you give the medical officer powers to cut and make a fair examination, if he does it quickly, and does not obstruct the trade more than he is absolutely forced to do.

Mr. MOODY, *Grimsby:* May I ask Dr. Marsden if he will give us his opinions about the Royal Commission's recommendations as to what meat inspectors should do, because they cut in any number of ways. You take a case into court upon them, and it may be argued one way or the other, and whichever is the strongest party wins, and the inspector loses his case. Does Dr. Marsden think that local tuberculosis is only local when the lesions are confined to the lungs?

Dr. MARSDEN: Yes, I do certainly. I should act on the schedule of the Royal Commission, which I think was perfectly legitimate and absolutely adequate. The only difficulty is that unfortunately in the notes which were sent out from the Local Government Board, they said "may," instead of "shall."

The PRESIDENT: I think that the terms "may" and "shall" have been held by Parliament to be identical.

Mr. PORTER: I will only occupy the attention of the meeting for a moment. I want to refer first of all to what Dr. Hime said with regard to the medical officers of health having the right to exercise their own discretion in regard to carcases. Dr. Hime is perfectly acquainted with the public health literature of a large and influential body, the largest branch, I believe, of the Medical Officers of Health Society in this country—I refer to the north-western branch, which includes such men as Dr. Niven and Dr. Marsden, who have had special experience—and they decided unanimously that it was not desirable that any medical officer of health could exercise his individual opinion. Therefore, I put it to you as a matter of common-sense that any advocate who knows his business, and brings the regulations or the recommendations of the Royal Commission properly before a magistrate, will get his client off unless the medical officer of health has gone to the inspection of that carcase with, so to speak, the regulations in his hand, and has followed those recommendations to the letter. The other matter to which I wanted to refer was the necessity for the protection of sanitary authorities. At the present time, under the Public Health Act, medical officers of health, not in their personal capacity, but in their official capacity, and sanitary authorities, are, and have been for some time past, subjected to the most vexatious actions under section 308 of the Public Health Act. Disputes have taken place under that Act at Brighouse—(Hear, hear)—Birkenhead and Scarborough—(Hear, hear)—and one at Stockton, about which you will not say "Hear, hear." In reference to that matter I suggest that, in pursuance of the recommendations which the Medical Officers of Health Society have proposed, legislation is urgently required to protect sanitary authorities in the matter of meat inspection, because if that protection is not accorded anything like efficient meat inspection will cease. The direction in which I suggest that protection should be extended is this. It should be an instruction to the arbitrator appointed under section 308 of the Public Health Act, that no claim for compensation should be sustained by him unless it can be shown to his satisfaction that the officers acting for the sanitary authority have been guilty of culpable ignorance or neglect; and secondly, that if the case is dismissed the Court should be bound to give a certificate that the prosecution has been properly brought, unless the magistrate is of opinion that the sanitary officer has acted with culpable ignorance and neglect. Thirdly, that the sanitary authorities should have power to appeal against the refusal of the magistrate to give such a certificate. There is one other point to which I wish to refer, and that is to this recommendation of the Local Government Board suggested by the Royal Commission. The Royal Commission recommended that the Local Government Board be empowered to make regulations. The Local Government Board have naturally since been empowered to make those regulations, and at the present moment they simply issue those regulations as a kind of fatherly advice. If they were issued as law, sanitary officers would then know how to act, and magistrates would have some legal guide by which to direct their actions. It has been urged in cases in which I have been concerned myself that this is a kind of permissive advice by the Local Government Board.

The PRESIDENT: The time for discussion has elapsed, and we have come to no decision on these regulations. Possibly you will think it just as well to postpone for another twenty-four hours the decision on the subject, which will be discussed to-morrow, at least, at all events, will be referred to to-morrow in the discussion on the milk trade. I will read what has been put into my hands, which will show that we do wisely, perhaps, to pause before coming to a decision on this matter. Dr. Koch says to-day that his new tuberculin obtained from human sources reacts equally on living human and bovine tuberculous subjects, thus admitting generic similarity.

DIVISION III.

PART I.

THIRD DAY, THURSDAY, JULY 25TH, 1901.

THE RIGHT HON. SIR HERBERT MAXWELL, BT., M.P., F.R.S., PRESIDENT, IN THE CHAIR.

THE PRESIDENT: Ladies and Gentlemen,—It is a matter of some regret that yesterday, owing to the extreme pressure of time, some of those gentlemen, both from foreign countries and from Great Britain, whose names had appeared on the paper as being engaged to take part in the discussion, were inevitably crowded out. I need not assure you that this was very far from the intention of the Council, but it was owing to the inexorable limits of time. I hope the same will not occur to-day. Our object is to promote as free and as wide a discussion as possible—as wide, that is to say, so long as it is concentrated on the subject under discussion. You see that to-day we have two important matters on the paper for consideration—the international aspects of tuberculosis, and the control of milk supplies. With the object of getting as fair a discussion on each of these important subjects as possible, I think we must decide that the discussion on the first paper must terminate at a quarter to twelve, as we adjourn at half-past one. If that is your wish, I will see that it is done.

[Agreed to.]

INTERNATIONAL ASPECT OF THE CONTROL OF TUBERCULOSIS.

BY ALFRED HILLIER, M.D.,
Visiting Physician to the London Open-Air Sanatorium.

WHEN I was asked to open this discussion I felt that a great honour and a great responsibility had been placed upon me. No branch of medicine has done so much for the improvement of the health of mankind, and, through measures of hygiene, for the actual prevention of tuberculosis, as that of public health. Among the medical officers of public health are distinguished men of science, whose efforts are unceasing and the value of whose work is equal to, if, indeed, it does not considerably transcend, that of any officers in any public service. Men, like myself and others, who are connected with the work of the National Association for the Prevention of Consumption, but who are not officially connected with the work of public hygiene, and who have neither the advantages nor the restraints which positions in the service of

public health confer, must feel that, while we may hope to stir public opinion and through public opinion stimulate legislation, the practical remedial measures to be carried out remain chiefly in the hands of the public officers of health. Such claims as I have to participate in this discussion must, then, rest on the fact that my efforts, in common with those of my colleagues in the National Association for the Prevention of Consumption, have been to disseminate knowledge, to organise public and philanthropic effort, and to render the work of the officers of public health more easy of execution. In order to clear the ground on which I now propose to base what I have to say with regard to tuberculosis, I submit we are in a position to lay down two conditions as essential to the establishment of tuberculosis in man. They are those which are essential for the culture of the tubercle bacillus in the laboratory.

The first is: The introduction of the tubercle bacillus.

The second is: A soil suitable to the requirements of the bacillus.

Other conditions favour or retard the establishment of the disease; these two remain paramount. All public effort, all hygienic legislation and practice directed against the encroachments of tuberculosis, must be based on a clear recognition of these two great factors. Any measure which militates against the establishment of either of them is to some extent a check upon tuberculosis. The great progress in public sanitation and improved housing which has been made in the last quarter of a century in this country, largely under the guidance of its State and municipal health officers, has undoubtedly been the greatest factor in the decline of phthisis in England. Wherever else it has occurred, this declension in phthisis is chiefly due to similar causes. The progress in measures of public hygiene has done much to fortify man against the establishment of the disease; in other words, to render the human soil unsuitable for the growth of the tubercle bacillus.

I do not propose in this paper to enter into a consideration of the various directions in which general improved social and hygienic conditions have made such progress. In other divisions of this Section these subjects have been fully dealt with. It is enough to note that their effect is entirely beneficial, and that in so far as they diminish tuberculosis they do so almost entirely by fortifying the constitution, by rendering the human soil unsuitable to the growth of the seed.

The question to which we ought, in my opinion, more particularly to address ourselves in this discussion is to what extent has scientific effort in different communities and different countries addressed itself to the checking of the first great factor in tuberculosis—to the introduction of the tubercle bacillus—to the sowing of the seed.

Have the conclusions to be logically deduced from our knowledge of the rationale of this disease been even yet adequately recognised and fairly applied?

The end aimed at is the destruction of the seed. By what channels is that seed conveyed from the focus of disease to fresh soil?

All are agreed that first and foremost stands indiscriminately distributed sputum.

Were protection from this source of danger secured, can you doubt that tuberculosis would become as rare as leprosy, more completely under control than small-pox?

With regard to the transmission of tuberculosis from animals to man Professor Koch has raised a question. But let us consider the *causa causans*, the all-potent factor in the perpetuation of tuberculosis. For the command, for the extinction of tuberculosis, wherever extinction is to be hoped for, the supreme necessity is the control of the sputum; for the control of tuberculous sputum involves, from a public health point of view, the control of all sputum. The danger to public health which arises from any case of phthisis under proper treatment in a public or private institution or in a private house, where ordinary precautions are taken with the sputum, is practically *nil*. It is the consumptive at large, or one nominally under treatment at a dispensary or out-patient department, that is the great source of mischief. The sputum of such a consumptive, more widely destructive than the virus of rabies, plague, and all those zymotic diseases combined against which such stringent precautions are enforced, is freely deposited in the dark and dusty corners which offer the most favourable environment for its desiccation and future dissemination. And this practice, responsible for the untold misery of suffering millions, proceeds almost without a check throughout the civilised world.

Let us now consider two great practical questions arising out of the possession of our knowledge on this subject.

First, what throughout the civilised States of Europe and America is being done?

Second, what, in general terms, are we called upon most urgently to do?

We are fortunate in having present at this Congress distinguished representatives from nearly every civilised country. From these gentlemen we shall learn much of what is going forward. To refer to all that has already been done in other countries, even to give an epitome of the practice of all countries, would exceed the time at our disposal. I shall briefly refer to the salient features of the work which is being undertaken in a few of them, rather with a view to giving examples than attempting to give any exhaustive account.

As Germany produced the discoverer of the tubercle bacillus, and the first exponent of the rationale of tuberculosis, Professor R. Koch, so does Germany stand pre-eminently first in one great branch of the work for the treatment and prevention of the disease. The movement for the provision of sanatoria in Germany is ahead of that in all other countries, and the provision is not for one class alone, but for all classes. An excellent paper on this subject was written by Mr. Charles Rube and published in the January number of the journal *Tuberculosis*, the organ of the National Association for the Prevention of Tuberculosis. In Germany, friendly societies, municipal authorities, district councils, benevolent associations, and even the State aided in the erection of sanatoria, but foremost of all in the work have been the State Insurance Institutes of the Imperial Board of Insurance with the affiliated sick and old age pension societies. There exist at present thirty-one

provincial State insurance institutes, with nine societies, which together have a fund of something like thirty millions sterling.

Mr. Rube writes: "Owing to the Act for the insurance of sick and invalided workmen of July 13th, 1899, which strengthened that of June 22nd, 1889, and which compels every workman and every workwoman from the age of sixteen who earns not more than £100 in the year to insure with the State, something like fifteen millions of the fifty-three million inhabitants of the German Empire are at present insured against sickness and old age, against incapacity to earn a living, and if we add to them another twenty millions of relatives dependent on them, we find that in round figures about thirty-five millions derive support from the benefit of this law. The law further empowers the authorities to institute the treatment in case the *capacity* of an insured to earn his living should be threatened by disease which might be cured." This led to the action of the State Insurance Institute in erecting sanatoria for the treatment of the insured.

The assistance which is given by the State to further the erection of sanatoria extends even to the Imperial Board of Woods and Forests. This department puts at the disposal of the authorities in different parts of the country suitable building plots of land in the State forests.

In consequence of this movement, which has resulted in the erection of some forty-five sanatoria, it will soon be possible to treat yearly 20,000 patients in Germany, each for about three months. The greater part of the patients go home cured, or much improved, after having gone through a simple course of hygiene, and it may be safely assumed that the man or woman so cured will spread the knowledge acquired, enjoin its benefits at home, and in turn will become a means of instructing others who are so unfortunate as to acquire the disease; and even when the disease still lingers, they cease to be disseminators of tubercle bacilli, because they have been taught to render their sputum harmless.

Dr. Schultzen stated at the Tuberculosis Congress in Berlin that, according to the statistics of the Imperial Board of Health, 65·7 per cent. of 2259 patients who left the different State sanatoria were so cured that they could take up their former trade; 6·5 per cent. had to find more suitable occupation, together 72·2 per cent.; and 12·8 per cent. could partly follow their former vocation; whilst only 15 per cent. were sent home unfit to work.

The statistics of the Imperial Board of Insurance show that in 1897 and 1898 8200 insured men and women were treated, and of these 5848, or 71 per cent., left the sanatoria fit for work.

The State Insurance Institute, Hanover, has treated up to the present about 5000 of their insured. The question whether it pays the institute to do this is constantly examined, in so far as the insured who have been discharged as cured or partly cured are kept for five years under a strict control as to their state of health and their wage-earning capacity. Lately the statistics as to those treated in 1892 and 1893 have been finished, and have proved, in a highly satisfactory manner, that the expenses incurred in

these years through the treatment of the insured have been amply covered by the saving in pensions.

If Germany has led in the matter of sanatoria, it is only right to say that, thanks largely to the efforts of Dr. Hermann Biggs, of New York, the United States has led in practical downright measures of prevention. In New York spitting is no longer merely a disagreeable habit, it is proclaimed a public nuisance and ordained by statute a penal offence.

Section 194 of the Sanitary Code of the Department of Health of the City of New York for the year 1900 is as follows:—

"Section 194. Spitting upon the floors of public buildings, and of railroad-cars, and of ferry-boats, and *upon any station, platform, stairs of elevated railroads*, is hereby forbidden, and officers in charge or control of all such buildings, cars, *platforms, stairs*, and boats, shall keep posted permanently in each public building and each railroad-car and *on each station platform of elevated railroads*, and in each ferry-boat, a sufficient number of notices forbidding spitting upon the floors; and janitors of buildings, conductors of cars, and *employés* upon ferry-boats and *station platforms* shall call the attention of all violators of this ordinance to such notices.

"And it shall be the duty of all persons or corporations manufacturing cigars or conducting the business of printing, where ten or more persons are employed on the premises, in the City of New York, to provide, and they are hereby required to provide, proper receptacles for spitting, in proportion of one to every two persons employed by them, and that the said receptacles be disinfected and cleaned at least once through each working day. That a copy of the second paragraph of this section be kept posted permanently in a conspicuous place in all cigar manufactories and in printing offices where ten or more persons are employed."

Anyone neglecting this special regulation will be liable to "arrest, with penalty, fine, and punishment." Offenders have actually been arrested, and fines imposed, with the full approval of the Press and public. What a democracy in the New World may do, when backed by public opinion, in the matter of interference with the liberty of the subject, without danger to the Government, surely the older states of Europe, aided by emperors, kings, and hereditary legislators, ought to be able to accomplish.

To France must be accorded the honour of having done more for the education of public opinion than probably any other country. National societies for the purpose of educating public opinion and directing effort for the prevention of tuberculosis exist in almost every civilised country to-day; but in this movement France led the way. The two most important societies are "L'Œuvre de la Tuberculose Humaine," which holds periodic congresses and publishes a quarterly journal, the *Revue de la Tuberculose*. Of this society Dr. Leon H. Petit was for many years the indefatigable secretary-general. The loss of this distinguished Frenchman was not merely a national, it was an international loss; and we all of us unite with our French colleagues in most deeply deploring the death of so ardent a disciple of that great cause which it is the humble endeavour of all of us to serve.

Allied to "L'Œuvre de la Tuberculose Humaine" is "La Ligue Française contre la Tuberculose." This is of a more popular character, and both societies have done excellent work in disseminating information and in bringing pressure to bear on various State and municipal departments.

The work of national societies for the prevention of tuberculosis deserves more careful attention than I am able to give it here. I can only hope that other members will find opportunity to treat the subject at more length. I am glad to see that Dr. van Ryn, of Belgium, is giving us a list of the countries in which action has been taken.

Notification of tuberculosis, both voluntary and compulsory, has already been freely discussed in this Section. It is worth noting, however, that Norway, about which Dr. Holmboë is making a short statement to the Congress, has recently passed a law making notification of tuberculosis throughout the kingdom compulsory.

Denmark has entered energetically into "la lutte contre la tuberculose." Denmark already, as Dr. Holzer Rördam will tell us, has created numerous sanatoria. In Professor Bang Denmark has an expert whose work in connection with tuberculosis in cattle has been of inestimable value. His experiments in the management of tuberculous stock are well known to agriculturists, and have been followed in many countries with great success. In England we have a strong association existing, numerous sanatoria in course of erection, and we have a Congress.

In many other countries much good work has been done, the results of which are common property. To refer to them here is impossible.

In the light of what has actually been accomplished in various countries, what are the practical measures we all unite in advocating? I submit the following propositions for your consideration :—

1. Tuberculous sputum, when dried, is the chief and most dangerous channel for the conveyance of the virus of tuberculosis from man to man. Sputum should therefore be placed under control, at least to the extent to which control is exercised over the other excreta from the body. The indiscriminate distribution of sputum should no longer be tolerated.

2. It is impossible to make provision merely prohibiting the consumptive from spitting indiscriminately. The distinction would be impracticable, for many cases of phthisis go to a late stage before recognition. There is therefore only one course. Spitting, except into a drain or proper receptacle, must be proclaimed and dealt with as a public nuisance. Expectoration in places of public resort should be dealt with on lines similar to those adopted by the Department of Health of the City of New York.

3. All public hospitals and dispensaries should present every out-patient suffering from phthisis with a leaflet containing instructions with regard to the prevention of consumption, and should supply and insist on the proper use of a pocket spittoon.

4. Cases of phthisis should not be received into the common medical wards of general hospitals. Early cases should be sent to sanatoria, incurable cases to special hospitals.

5. Notification of tuberculosis should be established wherever possible. If compulsory notification be impracticable, voluntary notification should receive every encouragement and support.

6. Sanatoria on approved modern lines should be provided, as in Germany, for all classes of the community. In this work the State, local authorities, and private philanthropy should be engaged, either singly or combined. All civilised States should do as the German Government has done—offer grants of State land to sanatoria financed by public or philanthropic funds.

7. The educational work of the great national societies for the prevention of tuberculosis, and their branches, is deserving of every encouragement and support. It is through their agency that a rational public opinion may be formed, the duties of public health officers made easier of performance, and such local and State legislation as may be requisite called into existence. As has been well said, public opinion is the breeze which fills the sails of the ship Government. It is the duty of the societies to fan that breeze.

The foregoing are some of the main propositions on which to-day I venture to think we should be unanimous. If tuberculosis is to fade from Europe like leprosy, or to be under control like small-pox, it will only do so after the principles underlying the foregoing propositions are fully recognised, and after such action as they imply is taken.

In May last year a very successful Tuberculosis Congress was held at Naples. At the close an International Committee was appointed to take the initiative in organising congresses. Representatives to this committee were elected by France, Germany, and Italy. Fortunately, in the alliance against tuberculosis Europe may stand united against the most deadly enemy of mankind, a common foe. What blight is to the corn, what phylloxera is to the vine, such is tuberculosis to humanity. The higher diplomacy of science, which should transcend all international jealousy, may well address itself to this great problem. May not the international movement begun at Naples be extended? Cannot a European committee or league be formed in which all civilised countries should be represented? The work of that committee might be extended to more than the organisation of congresses. I venture to think that such a committee should formulate the principles on which all are agreed, should define the broad lines of action on which it is desirable for States, municipalities and individuals to proceed. A committee with such functions might well consist of representatives elected by the great national societies and others nominated by different governments. The functions of such a committee would of course merely be deliberative and advisory—but the hands of governments, municipalities, and the national societies would all be strengthened by its counsel.

Concerted action among the Powers on questions of public policy are becoming yearly more familiar to us. We sometimes are inclined to chafe at the slow movements of a ponderous machine. We sometimes complain that the results are small; but I believe the effect of these conferences is deeper and more abiding than we are inclined to suppose.

Perhaps the most interesting precedent for such a committee or conference

as I venture to urge in connection with tuberculosis is to be found in the Brussels Conference of 1889–90, dealing with African natives. This conference resulted in the general Act of the Brussels Conference to which the Powers of Europe were signatory, and the Act bound the signatory Powers, not only to suppress the slave traffic wherever it still lingered, but it provided that within the whole of Central Africa, when it shall be ascertained that either on account of religious belief or from other motives, the use of distilled liquors does not exist or had not been developed, the Powers shall prohibit their importation or manufacture.

Where alcohol is distributed without restriction among the negroid races of Africa it decimates them. Against such decimation of natives by alcohol Europe has entered into a league. Is not the decimation of Europeans by tuberculosis even more terrible? I do not wish to press the analogy too far, but it is worthy of note and consideration.

Legislation alone can never terminate many of the abuses associated with the spread of tuberculosis; but legislation fortified by public opinion can and will do so, and the first step which modern Europe has to do is to revive and honour a common and ancient heritage—that Roman law which says, *Salus populi suprema lex.*

DR. MONTIZAMBERT (*Director-General of Public Health, Ottawa, Canada*): Mr. President, Ladies and Gentlemen,—I am commissioned by my Government to bring to this meeting a most kindly and hearty greeting from the Dominion of Canada, and to express to you the hope and the confidence with which my country is looking forward to the practical results of this great Congress. (Cheers.)

NOTES ON TUBERCULOSIS IN THE DOMINION OF CANADA.

BY F. MONTIZAMBERT, M.D. (Edin.), F.R.C.S.F., D.C.L.,

Director-General of Public Health, Ottawa, Canada; Delegate of the Canadian Government.

TUBERCULOSIS in the Dominion of Canada, as elsewhere, has heretofore levied a heavy tax upon the well-being and the lives of the people. Some 8,000 deaths per annum in Canada are attributed to this disease. Some of these are, of course, amongst native-born Canadians; others are amongst those who have brought the seeds of the disease with them from other countries.

Here, as elsewhere, the knowledge of the true nature of the disease and the methods of its spread has advanced *pari passu* with the advances of medical science. With this extension of knowledge in the medical profession have come also wiser counsels to patients and their friends, and to the public. This was, until recently only, the action of boards of health, of medical societies, of individuals, and of comparatively small local associations. This year, however, His Excellency Lord Minto, the Governor-General of Canada,

has organised and set in motion a national movement for the prevention and cure of this disease. He has caused to be formed the Canadian Association for the Prevention of Tuberculosis. Of this association His Excellency is the Honorary President. Amongst its Vice-Presidents and in its Council are leading and representative men from each and every province and territory from the Atlantic to the Pacific, from the Yukon on the one side to Cape Breton on the other. The first meetings were held in Ottawa in February last, and the work of this general national movement was begun—the work of endeavouring to rouse to a sense of their danger the mass of the people, whilst at the same time a knowledge of the possibility of prevention and cure is brought home to their minds. And they are thus both encouraged and urged to take the practical measures necessary to attain the great object in view—the limitation, if not, indeed, the extinction, of this preventable disease.

This action of His Excellency has been received with grateful appreciation and hearty co-operation by all. Active steps have been and are being taken to make the association a great educational and practical success, and high hopes are cherished of the results to be attained.

In the Dominion of Canada much of the jurisdiction in, and administration of, matters of public health falls to the different provinces and municipalities. Already some of these are moving in this matter of the prevention and cure of tuberculosis. During last year the Province of Nova Scotia passed an Act through its Legislature to empower the Province to erect, furnish and equip a sanatorium for the care and treatment of persons suffering from tubercular disease of the lungs in its earlier stage. And the Province of Ontario, in an Act respecting municipal sanatoria for consumptives, empowers, subject to the provisions of the Act, any municipality or any two or more municipalities to establish a sanatorium for the treatment of consumptives.

Of private institutions for this purpose perhaps the two largest and best known are that at Ste Agathe des Monts, in the Laurentian range of mountains, some sixty miles from Montreal, and that at Gravenhurst in the Algoma district of Ontario, within easy reach from Toronto.

If there be anything in climatic influences in the prevention and cure of tuberculosis, Canada offers a wide field for choice. She stretches from ocean to ocean, and her vast inland tablelands and mountain ranges offer all the elements of dryness, altitude, and clearness of atmosphere, with absence of strong penetrating winds, that may be desired. And this with a variety of grandeur of scenery and full opportunities for out-of-door sports, hunting, fishing, etc., for those who seek them; and for all the pleasant summer weather and the dry and invigorating cold in winter render life and rest out of doors a possibility and a benefit at all seasons of the year, by night as well as by day.

With such conditions as these available we may fairly hope that when the people can be educated up to the realisation of the truth as to the communicability of tuberculosis, and the means of controlling its diffusion and spread, a marked diminution, both in its frequency and in its mortality, may speedily be attained.

THE ANTI-TUBERCULOSIS CAMPAIGN IN MAINE.

By Professor ROBINSON, *Delegate from the State of Maine, U.S.A.*

As introductory to the few words which I would offer about what has been done in our State to lessen the prevalence of pulmonary tuberculosis, it may be said that the public health organisation of the State of Maine consists of local, or municipal, boards of health and a State Board of Health. While the policy of the State is the encouragement of local self-government in sanitary as in other matters, it is the office of the State Board to direct and co-ordinate the public health work in the commonwealth, to advise and help the local boards, and to urge them to prompt and efficient work.

The statutory law makes pulmonary tuberculosis a notifiable disease. Thus far the compliance with the requirements of this law has not been very general.

The instructions of the State Board of Health to local boards are to the effect that houses in which there are cases of consumption shall not be placarded, as is customary in the management of dangerous infectious diseases which run a more acute course, that they shall not be quarantined, but that a record shall be made of the cases, and that a copy of the circular published by the State Board on "The Prevention of Consumption" shall be placed in the household, preferably through the hands of the attending physician, when a physician is in attendance. When a dwelling or a room occupied by a consumptive has been vacated by the death of the patient or by removal to another place, the instructions to the local boards are to require the disinfection of the room or dwelling, and, when necessary, to enforce the disinfection before it can be occupied again, if it is a rented dwelling. If, on the other hand, the family own their home, they are merely advised and urged to have the disinfection done.

Thus far the most efficient part of the work of lessening the mortality from tuberculosis has been done on educational lines. In 1889 the State Board issued its "Circular No. 54, Prevention of Consumption." This has, in the twelve years which have since elapsed, been printed in large editions, and has been widely distributed by local boards of health, by physicians, by clergymen, and by other persons. The State Board has, furthermore, exerted a constant educational influence in the same direction through the medium of its official bulletin, *The Sanitary Inspector*.

The results of this educative influence of the Board, aided by that of the general press, have been encouraging.

A trustworthy system for the registration of vital statistics was not in operation until the beginning of the year 1892. For the eight years, 1892–99, for which the registration reports are already made, the number of deaths in the State from pulmonary tuberculosis has been 1352, 1299, 1262, 1195, 1172, 1128, 1021, and 1015 respectively. The mortality rate from consumption for these eight years has been 20·24, 19·35, 18·80, 17·71, 17·21, 16·47, 14·85, and 14·69, for each 10,000 of estimated living population, the estimate being based

upon the census enumerations in 1890 and 1900. There has thus, in these years, been a smaller number of deaths from consumption in each succeeding year, and a diminution of the death rate from 20·24 to 14·69; in other words, a lessening of this special mortality rate of more than one-fourth in the seven years since the compilation of the first registration report.

In the latter part of last year the State Board of Health took the initiative in suggesting and bringing about the incorporation of the Maine State Sanatorium Association, the object of which is to provide one or more sanatoriums in the State for the treatment of consumptives by the modern open-air method. The movement met with an enthusiastic reception from the public, a large number of persons have become members of the Association, and it is hoped that a sanatorium may be built before long.

THE PRESENT POSITION OF THE CRUSADE AGAINST HUMAN TUBERCULOSIS IN VARIOUS COUNTRIES.

By Dr. VAN RYN.

General Secretary of the Belgian National League against Tuberculosis.

Tuberculosis is a universal scourge, existing in every country in the world. It is, therefore, natural that there should be a general endeavour to limit the ravages of a disease which annually destroys three million people in the whole world, which, reckoning the population of the globe at 1,500,000,000 individuals, gives an average of 15,000,000 persons suffering from this disease.

It is especially since science has established (1) that tuberculosis is contagious; (2) that it is avoidable; (3) that it is curable, that people have gradually begun to employ all the recognised methods to check its propagation. This gave rise to the leagues against tuberculosis, and the propaganda in favour of the creation of sanatoria, and later of dispensaries.

The Governments of several countries take part in this contest against tuberculosis.

I pass in review in my paper now presented what is actually being done at the present time by governments, by philanthropic associations, and by private persons, on behalf of the crusade against this modern scourge in the following countries:

1. Europe.—1. Germany; 2. England and her Colonies (Australia, Canada, New South Wales); 3. Austria; 4. Belgium; 5. Bulgaria; 6. Denmark; 7. Spain; 8. France; 9. Holland; 10. Hungary; 11. Italy; 12. Monaco; 13. Norway; 14. Portugal; 15. Roumania; 16. Russia; 17. Sweden; 18. Switzerland; 19. Turkey.

2. America.—20. Brazil; 21. Chili; 22. United States; 23. Mexico; 24. Argentine Republic.

3. Asia.—25. Japan.

I am only concerned at present with human tuberculosis.

[See full Paper at end of discussion, page 195.]

MEASURES TAKEN AGAINST TUBERCULOSIS IN DENMARK.

By HOLZER RÖRDAM,

Chief Physician of the First Class of Naval Marine.

COMPARED with many other countries in Europe, Denmark remained for a long while behind-hand in the struggle against tuberculosis, but during the last few years the inhabitants have taken up the matter with considerable energy.

The oldest hospital for tuberculous patients is situate in the peninsula "*Refsnaes.*" It was founded in 1874. It was arranged at first for 100 patients; later it was increased to accommodate 130, without reckoning twelve beds in the establishment for patients suffering from epidemic complaints, and sixteen beds in the ward for ordinary diseases.

The hospital only admits scrofulous children.

The construction of the whole establishment cost about 500,000 francs, and the fitting of it up about 60,000 francs. The money for the construction and the working of the hospital has been furnished up to a certain point by private benefaction; but the State and the municipalities have also contributed their quota. Thus, under the Financial Act of last year, a sum of 35,000 francs was voted from the Treasury, and the municipality of Copenhagen supplied 12,000 francs. The annual working expenses amount to 125,000 francs. Several savings banks, the great monastery of "Vallor," as well as the "Classen" Trust, are donors of contributions. During the last twenty-five years the total number of scrofulous children treated has been 2,750. 1,222, or 52 per cent., have been completely cured; 878, or 35 per cent., have attained to a remarkable degree of health.

The Municipality of Copenhagen possesses, in addition, a small hospital for scrofulous patients at Snogebeck, in the island of Bornholm, where seventy children were treated last year, this costing 10,000 francs.

The Society for Children's Hospitals in Copenhagen and its Suburbs, which was formed ten years ago, now possesses an establishment at Hellebock, at which 197 children were treated in 1899. The aim of the Society is to found a sufficient number of small hospitals situate on the sea-coast, where weakly and, above all, scrofulous children shall be admitted without pay.

The "Finsen" Institute was founded on the initiative of Professor Niels Rigberg Finsen, in 1896, for the purpose of making experiments, and of contributing to the progress of research on the effect of light on living organisms; above all, with the intention of utilising the rays to the benefit of practical medicine. The Institute, the administration of which is under the presidency of M. Blagemann, manufacturer and municipal councillor, has received numerous private donations, and by the Financial Act of 1900 it has been voted a sum of 350,000 francs, as a loan without interest. The Institute is established at "*Rosenvaenget*," in Copenhagen. The number of lupus patients that have been cured is very considerable.

A large hospital for scrofulous children at *Juilsmind* is in construction; the Treasury has supplied 80,000 francs, and Prince Carolath has made a present of an excellent site.

As a hospital for phthisis properly so called there exists but one at the present time, situate on the fjord of Vejle à Fakkegrav; it was opened on March 1st, 1900, with room for 92 patients. The hospital was founded under the name of "Hospital for Consumptives" by a society the aim of which is philanthropic. The dividend on shares being limited to 4 per cent., the subsequent profit will be employed to lessen the payments of those in straitened circumstances. The president of the administrative council is Professor Borck, doctor of medicine. The president of the management is M. Reisz, Councillor and doctor of medicine. Danish physicians have contributed a sum of 60,000 francs, and private persons 300,000 francs. The Treasury has given 150,000 francs, and for non-paying rooms a donation of 30,000 francs has been received. The sanatorium is situated on the fjord of Vejle, and possesses forest-land 42 hectares in extent. All expenses included, the hospital has cost about 1,100,000 francs, that is to say, 12,000 francs per bed. During the ten months March to December, 1900, 206 patients have been treated at the sanatorium. The payment for Danish subjects per day is 10 to 11 francs for a separate room, 8 to 10 francs for a common room. To foreigners the highest fee is 5 francs daily. The hospital is under the management of Dr. Sangmann, the head of the staff.

The Municipality of Copenhagen are having a Sanatorium for Consumptives constructed in the forest of *Boscrup*, near *Roskilde*. For this purpose the Municipal Council has voted a sum of 800,000 francs. Two buildings will be constructed for the patients, one with 55 to 63 beds for men, and the other with 48 to 56 beds for women. The buildings have three stories and basements. Later on it is intended to construct a third house, which will permit of the patients being increased to the number of 102 to 110 men, and of 54 to 63 women. The payment will be 2 francs per day.

Up to the present day this is all that has been done in Denmark in the way of constructing sanatoria. On the part of physicians, however, much energetic work has been done in this direction. In 1898 the Association of Danish Physicians presented a petition, supported by an address signed by 200,000 of the population, to the Government and to the National Assembly, having as an object the construction of sanatoria for consumptives, as well as the founding of hospital establishments and the supply of aid to the families of patients. For this purpose they demanded the nomination of a commission; and the relief organisations in cases of sickness have, in 1900, presented an address, supported by 250,000 signatures, requesting the establishment of three State sanatoria. On grounds of expense, the Government have not ventured to include this item in their Budget.

On January 19th, 1901, at the instigation of M. Rördam, Chief Physician of the First Class, and deputy; also of M. Karl Loventsen, doctor of medicine and editor of the Danish journal of hygiene, *The National League to combat Tuberculosis* was founded. The League was received with great enthusiasm

on the part of political personages of the highest distinction, physicians, civil servants, and financiers. The minimum annual subscription is three francs, and the League now numbers 10,000 members, this giving an annual income of 100,000 francs. The Prefect of the Municipality of Copenhagen is President of the Alliance, and the President of the Chamber of Deputies, the Vice-President, and the Deputy M. Rördam are the Directors of the Committee of Operations. The aims of the Alliance are the establishment of popular sanatoria for the poor, public lectures to enlighten people as to the nature of tuberculosis, and the giving relief to the families of patients. The League is divided into twenty-five sub-sections, with local administration. In the course of the summer noted physicians, as well as political men, will hold a hundred meetings throughout the country, for the purpose of giving information as to tuberculosis, and making collections for the League. The Alliance has its office at 63, Gothersgade, Copenhagen.

In 1898 there appeared, at the expense of the Treasury, a leaflet on the nature and contagious character of tuberculosis. Of this 100,000 copies were distributed among the public. In all public establishments, as well as in many other places, information as to the nature and contagiousness of tuberculosis has been placarded about; similarly, expectorating has been forbidden on all tramways and in railway carriages.

As to precautions established by law against tuberculosis, there are very few of them in Denmark. According to the law relating to epidemics, gratuitous disinfection after cases of death due to tuberculosis is enjoined; the same law enacts that apprentices, before being admitted to manufactories, are bound to show a doctor's certificate declaring that they are in good health; and by a new law relating to labour in factories, decreed last year, some regulations as to cleanliness in these establishments have been enacted. But that is all that has been done on the part of the Legislature.

The Sanitary Commission of Copenhagen, on the other hand, by a decision dated May 15th, 1901, has enacted that by public provisions pending a new order, practising physicians may have sputum examined for tubercle bacilli free of charge, in doubtful cases of phthisis. Receptacles required for the receipt and transmission of the sputum are to be had from all the pharmaceutical chemists in the city, and are delivered up for examination at the laboratory of the Sanitary Commission, 12 Norrevaldgade. The laboratories, in their turn, will send a written report on the result of the analysis to the physician concerned at the earliest possible moment.

In almost all the towns of Denmark control over meat supply is established, but it is solely an affair of the town whether it elects to put such control in force.

In regard to tuberculosis among animals, thanks to the efforts of Professor D. B. Bang, Denmark occupies a position among the most advanced nations. In each year's Budget there are voted on behalf of this department three or four hundred thousand francs. By means of subsidies from the State on behalf of voluntary inspections against tuberculosis, every owner is authorised to have his live-stock disinfected; and it is ordered by law that the milk served from

dairies as provender for cattle must be heated to 100° Celsius. Similarly, cattle suffering from tuberculous inflammation of the udder must be slaughtered pending compensation to the owner; and the residuum of the products of centifrugal machines must be burnt and not used as pigs' provender.

In almost all the principal towns there are private associations which are charged with controlling the wholesomeness and the price of milk.

All things considered, it appears that Denmark has not progressed badly in the battle with tuberculosis. As to the mortality caused by tuberculosis, it is diminishing in a very remarkable manner.

MORTALITY FROM PHTHISIS.

	Per thousand of those living.		Per thousand of those deceased.	
	Copenhagen.	Other Towns.	Copenhagen.	Other Towns.
1870–74	3·42	2·53	143·1	131·8
1875–79	3·14	2·34	129·2	114·2
1880–84	2·89	2·24	124·0	112·6
1885–89	2·51	2·28	112·8	117·8
1890–94	2·05	2·20	99·0	105·6
1895–98	1·86	1·84	106·3	103·4

IN WHAT MANNER DO THE DIFFERENT NATIONS DEFEND THEMSELVES AGAINST TUBERCULOSIS, AND HOW OUGHT THEY TO SO DEFEND THEMSELVES?

INTERNATIONAL AGREEMENT.

BY DR. SAMUEL BERNHEIM.

IN order to study the actual state of this question I have communicated with several colleagues in various countries of Europe, and most of them have replied. In certain countries absolutely nothing or very little has been done.

In other countries the "sanatoria" system or the anti-tuberculosis dispensaries system is or has been in vogue, with the application of sanitary laws. All these means are excellent in their way, but insufficient. In fact, intercourse between the different nations is to-day so great that international contagion is unavoidable.

To accomplish a result, successful and efficacious, which would be useful in all countries, it would be necessary to have an international agreement or understanding, which would define the remedies to be generally applied. This has already been carried out for plague, cholera, and yellow fever. It would therefore be necessary that doctors of every country (at least, those of Europe) should agree among themselves to memorialise their respective governments to nominate a permanent anti-tuberculosis committee or commission, and to furnish it with powers to dictate prophylactic measures and to rigorously supervise their application.

[See full Paper at end of discussion, page 221.]

THE TREATMENT OF PHTHISIS AS A PREVALENT DISEASE IN HOLLAND.

By Dr. R. de JOSSELIN de JONG, *The Hague, Holland.*

When the invitation sent by the committee of organisation of this Congress reached me, as one of the founders and secretary of the society for organising sanatoria in Holland, I was especially glad to be able to accept it, because the movement is with us still in course of development, and I was convinced that for us, beginners, there could be much to be learnt here on this subject. Allow me, in a few words, as a contribution to a general survey about the organisation of sanatoria in Europe, to relate the state of affairs in Holland.

We must not be looked upon as behind-hand because Holland is among the last countries to erect popular sanatoria. This has been caused by the historical succession of opinions as to how phthisis should be contended with. How long was it not believed that high mountain air was the first essential for a good health resort for consumptives? and to this day many are found who see the strongest therapeutic agency in the influence of higher air.

For some years a home for poor Dutch consumptives has existed in Davos-Platz, started by private charity, but the idea that we should build our own sanatoria in the mother-country—our low-lying Netherlands—has only been conceived in the last few years, after the experience gathered at home and abroad had taught us that the dogma of the mountain air therapy could be abandoned.

Dr. Hamoeh, our Nestor and president, Professor Kooyker, and Dr. Wynhof, as well as others, have repeatedly called attention not only to the possibility, but to the urgent necessity, of founding popular sanatoria in our own country. What is being accomplished at Tuselbad, Laubbach, Halle, Rehburg, Bournemouth, and other places can be accomplished with us, while it will be counted an advantage that the patients recover in the same climate in which they became ill. The change from sanatorium to their former life is less great if they have been treated in their own country.

In the beginning of the year 1897, about twenty men united to form a founding Committee. Among them were the professors for internal diseases of all the four universities. This Council has succeeded in awakening the interest of the country in their plans, and a society has been formed for the erection and provision of popular sanatoria for consumptives in Holland. Seventy subdivisions were formed in different parts of the country, with about 5,000 members. H.M. the Queen-Mother graciously consented to become the patroness of the society. In the course of the first year 200,000f. had been collected, and the plans could be drawn up for the first sanatorium.

The great question in our country was, where the first sanatorium should be—on the sea-coast, or in the interior? Professor Kooyker had already spoken on this subject at the Berlin Congress in 1899, and touched on the difficulties and advantages of both situations.

Notwithstanding that, in proportion to the size of the country, our coast-line is a long one, it is very difficult to find a suitable spot for a so-called "seaside sanatorium." The exposure to west and north-west winds makes most of the places on the coast unsuitable, especially in winter.

We decided to begin with an inland sanatorium, and believe we have found an excellent situation for it in the east of the country—in the province of Overysel. It is, however, still most decidedly our purpose, when we are in a position to build a second sanatorium, to have it on the coast, as we are convinced that the strong, pure sea air will be a mighty power against phthisis; and although this air may not be suitable for more erethic constitutions, for less serious cases and for torpid tuberculosis it will, without doubt, be of the greatest advantage.

This has been sufficiently proved to us by the beneficial effect a stay at the seaside has upon scrofulous children.

There is a second reason why a seaside sanatorium should in time be built in Holland. H.M. the Queen-Mother, when she ceased to be Regent in 1898, presented her estate, Orange Nassau, together with a sum of 250,000 francs, being part of the sum collected by the people for a national memorial to her honour, to found a sanatorium for consumptive patients. Orange-Nassau Oord lies in Gelderland, also in the east of our country, and will thus be an inland sanatorium as well. This establishment is intended for paying patients only. Her Majesty appointed a separate committee of six members to manage her sanatorium for her. It will be opened in the course of the next two or three months as well as ours, so that before the end of this year Holland will possess two large sanatoria for consumptives. A third will soon be erected by the city of Amsterdam not far from the coast of the Zuyder Zee.

As I have said, the sanatorium "Hellendoorn," which will be opened in Overysel, and so called after the neighbouring village, bears the character of other Continental establishments. It will at first contain fifty-four beds, but it is intended to enlarge the institution to accommodate 105 patients. It is intended only for poor patients, and as much as possible—that is to say, for as much as the annual contributions will allow—the inmates will be treated gratis. In order to make the number of free patients as large as possible, an attempt will be made to enlarge the funds by soliciting annual contributions from the Government, the various communities, and the industrial insurance societies. The less needy patients will pay a certain fixed sum, about 3*s.* 6*d.* a day. It is arranged to accommodate both men and women, strictly separated from each other, with special kitchen arrangements for Jews. The principal building is in the shape of a slightly bent half-moon, opening on the south. The verandahs, where the patients will be in the open air, are in the wings, while the domestic department is on the north side, more or less by itself. The building is sheltered on the west by extensive pine woods, and on the north and east by hills covered with pine woods. A beautiful view to the south and west greatly increases the attractiveness of the place. Electric light and a central heating apparatus are being laid on. The floors are covered with torgament, as is the case at Sulzhaim in Uarz. It is rather expensive to put

down, but its durability renders it cheaper in the end. Drinking water of excellent quality has been procured on the spot by boring.

More than six patients will not be allowed in one room; generally there will only be four.

Within an hour's distance there are no factory chimneys, and no railways, so that there will be no fear that the air will be poisoned by either. The soil is sandy, dry, and porous.

I have myself been able to prove by experiments in the sand dunes near the Hague that bacteria, among others even the rather vigorous *bacillus prodigiosus*, are entirely destroyed in a few days in sand, so that for a sanatorium for tuberculous patients this soil is especially suitable.

As for the air itself, there are still followers to be found of the doctrine, "*No cure without mountain air*," but in our country we have ceased to believe in this exclusively.

Last year a small private sanatorium was opened near Putten, in Gelderland, on a spot surrounded by pine woods and at about an hour's distance from the Zuyder Zee. The patients were able to be out of doors there until nine o'clock, or even sometimes till half-past nine, all the year round, just as well as in Honnef and other places. The results gained there will bear comparison with those gained at foreign sanatoria. The experience gathered has been short, but it does not in any way put our expectations to shame; on the contrary, it gives us reason to expect great things of a sanatorium built after the strictest and newest improvements, as that at Hellendoorn will be.

The patients will be subjected to a very strict *régime*, analogous to the rules laid down in like foreign sanatoria.

And here I venture to remark that the earnestness and perseverance with which the director and the nursing staff imprint these rules upon the minds of the patients, impressing upon them their immense importance, will to a great extent limit the useful effect of the sanatorial treatment *directly* and *indirectly*. I purposely use the word "indirectly," because, to my thinking, the *indirect* influence of a sanatorium is not the least of the two.

A sanatorium for consumptives must have two useful effects:—

(1) The improvement of the health of the patients admitted. This is a matter of course; and—

(2) It must be a centre from which good and clear ideas on the subject of hygiene are constantly being spread amongst the poor and less intellectual classes.

The discharged patients must be so imbued with the value of good fresh air, simple but nutritious food, a quiet, even mode of life, cleanliness of their homes as well as of their persons, and so on, that upon their return to their former life they may become the teachers on hygiene to those about them. The experience I have had in this way, in only a few years, from different patients treated in Davos-Platz is really surprising.

The patients receive a printed list of the rules they have to keep, together with a number of useful hints which may be of benefit to them in their further life.

I cannot leave this subject without saying a few words on *two points* which belong to it, and which seem to me to be of the greatest importance. If the treatment in a sanatorium is to have the good and lasting effect that is to be expected, it is absolutely necessary that if the patient admitted is the breadwinner of a family (as is often the case), provision be made for the remaining needy members of the family. The board of our society has therefore urged the sub-committees to take care that in such cases assistance is rendered to those left behind. This will relieve and cheer the mind of the patient, and have a good influence towards his or her recovery.

In the second place, care must be taken that what has been gained in the sanatorium is not lost as soon as the discharged patients return to their own unhealthy surroundings. In other words, the improvement of the houses of the working classes should keep step with the erection of sanatoria. In dry, well-ventilated, healthy working-men's homes the entirely or partially cured patient will be able to continue in the hygiene rules of life begun in the sanatorium, and the results gained will remain or even be improved upon. It seems to me that this is one of the most weighty points which can arise in a discussion about the benefit of sanatorial treatment.

In our country various private parties are doing much in this direction. The well-known Agnetapark in Delft can be quoted as an example.

As it is especially desirable that only those patients are admitted who are in a not too far advanced stage of the disease, the application must be made by the family physician, with the additional advice of a specially appointed medical man. There will be twenty of these consulting physicians appointed in different parts of the country. After their application the medical director must decide whether or not the patient can be admitted.

By these means we in time hope to be able to show results which can equal any of those obtained in foreign sanatoria.

THE CAMPAIGN AGAINST TUBERCULOSIS IN BORDEAUX.

By Dr. J. HOBBS.

In the campaign against tuberculosis the town of Bordeaux, at the suggestion of the assistant health officer, Dr. Dupeur, has just founded an Anti-tuberculosis Society, under the direction of MM. Solles, Hobbs, Mongom, and Baillet.

This society, which has been in operation barely a month, aims at collecting all documents relating to tuberculosis, to give them away, to encourage the use of tuberculin in the stables from which milk is supplied, to render assistance to doctors in the town and the department in any doubtful cases among their patients.

The doctors send for analysis the sputum or other specimen from the case of suspected tuberculosis; a bacteriological examination is made, and if this examination is negative, inoculation in guinea-pigs is practised. The result is immediately forwarded to the doctor in question.

The society proposes to distribute from house to house a small pamphlet showing all the practical hygienic precautions which ought to be taken by the head of the family against tuberculosis.

At the same time they propose to distribute among the very poor packets containing 2 grs. $HgCl^2$ and 10 gr. NaCl to be dissolved in a litre of water. This liquid is designed to ensure the disinfection of sputum.

Although the society has been in operation scarcely a month and is not yet very well known, it has performed seventeen examinations.

THE CONTROL OF TUBERCULOSIS IN PORTUGAL.

By Monsieur J. J. DA SILVA AMADO.

Au Portugal on a entrepris de combattre le fléau de la tuberculose au moyen des efforts combinés de tous ceux qui sont à même de pouvoir réussir dans cette enterprise.

Une association, sous la présidence de Sa Majesté la Reine de Portugal, nommée l'Assistance Nationale contre la Tuberculose, a réuni des sommes très considérables, et a réalisé et est en train de réaliser des travaux très efficaces pour le combat de la tuberculose, tels que sanatoires, dispensaires, etc. Mon collègue et compatriote, M. le Professeur Lancastre, vous donne des renseignements très complets sur ces travaux.

Une autre association a été créée, sous le nom de Ligue Nationale contre la Tuberculose, dont je suis le président, et M. le Professeur Bombarde le secrétaire général, et elle a un grand nombre d'associés, surtout des médecins. Cette ligue a son siège à Lisbonne, mais possède des noyaux dans les principales villes du pays, avec les mêmes statuts. On fait la propagande des mesures efficaces pour éviter la propagation de la tuberculose, on fait des conférences dans toutes les classes de la société, même dans les sociétés d'ouvriers, et ainsi on répand les informations nécessaires pour éviter le contage de la maladie.

Pour intéresser tous les médecins nous avons réuni un Congrès National contre la Tuberculose, qui s'est réuni à Lisbonne, dont j'envoie les procès-verbaux.

J'envoie aussi au Congrès un petit mémoire imprimé indiquant l'organisation de la Ligue portugaise, ainsi que plusieurs publications faites par cette association.

By Professor LANCASTRE, *Lisbon.*

C'est avec le plus grand plaisir que je viens vous présenter la notice sur l'organisation de l'Assistance Nationale aux Tuberculeux, qui représente l'association de la généreuse initiative de Sa Majesté la Reine de Portugal et de la protection efficace des Municipalités et du Gouvernement Portuguais, que j'ai l'honneur de représenter ici. Comme vous le verrez, l'Assistance n'est pas exclusive dans ses procédés. Elle a établi comme ses moyens de combat la propagande par la parole et par l'action.

Par la parole, en enseignant la prophylaxie de la tuberculose dans de

conférences, en écrivant des articles dans tous les journaux populaires, et par la publication de feuilles qui se distribuent gratuitement. La propagande a été fortement aidée par la Ligue Nationale contre la Tuberculose. Sans l'opinion faite la prophylaxie de la tuberculose devient presque impossible. Le jour où le public comprendra la gravité de la maladie, les moyens par lesquels elle se transmet, et la manière de l'éviter, la tuberculose perdra son hégémonie dans l'obituaire des nations. Par l'action, la propagande se fait par la distribution gratuite de crachoirs collectifs ; par l'organisation d'instituts, dispensaires et sanatoria pour scrofuleux et tuberculeux. Un des résultats immédiats de l'action de l'Assistance Nationale aux Tuberculeux a été, avant tout, à Lisbonne la séparation des tuberculeux des autres malades. À présent ceux-là ont des hôpitaux privés. En relation à la valeur sous le point de vue social, l'Assistance Nationale aux Tuberculeux a classifié les établissements à créer, par l'importance qu'elle leur attribue :

1° Instituts et dispensaires ;

2° Sanatoria pour scrofuleux ;

3° Sanatoria pour tuberculeux.

Cette classification, cette importance relative, il faut dire, est determinée principalement par la raison économique. Si on avait des moyens pour construire d'emblée des milliers de sanatoria pour y enfermer les 150,000 à 200,000 tuberculeux qui existent en Portugal, le résultat serait bien plus radical et rapide. On aurait à nous conseiller l'exemple historique de la manière dont on a combattu la lèpre. Mais, dans l'impossibilité de le faire, l'Assistance Nationale aux Tuberculeux a entendu que la préference devait être donnée aux dispensaires et instituts.

Comme vous le verrez par la notice, tandis qu'on a cherché à obtenir les ressources nécessaires à la réalisation de l'œuvre, par cession généreuse de leurs Majestés nous avons pu, dès la première année, inaugurer dans un château historique, au bord de la mer, un sanatorium provisoire pour 36 enfants scrofuleux.

C'est dans le même local, dans les antiques bâtiments du château, que nous édifions en ce moment un sanatorium pour 128 enfants scrofuleux, *et dont le plan est dans le musée d'architecture de ce congrès.* Au même temps nous avons contribué à l'achèvement d'un autre, près de Lisbonne, aussi pour des scrofuleux, avec 30 lits.

Après les dispensaires l'Assistance a compris que ce qui produirait le plus grand résultat social, relativement au problème de la tuberculose, était le traitement des enfants faibles et scrofuleux ; c'est ainsi qu'elle a accepté avec enthusiasme la charge des sanatoria d'Ontão et Carcavellos, desquels je viens de parler, et encore pour compenser l'insuffisance de notre concours à present par l'emploi des sanatoria, elle organise les bains de mer pour les enfants nécessiteux. Chaque jour, pendant les mois d'août, septembre et octobre, des groupes de 80 à 100 enfants iront de Lisbonne par le chemin de fer à une plage voisine, où après le bain on donnera à chaque enfant une réfection de lait stérilisé et pain. L'Assistance tâchera de faire, encore cette année, le même dans quelques autres villes du royaume.

La commission chargée d'étudier un local convénable par son climat et

conditions topographiques pour un sanatorium pour tuberculeux, a parcouru divers endroits, et encore elle n'est pas fixée sur ce point; dans un pays essentiellement maritime il est difficile de rencontrer un lieu assez abrité des vents. Je sais, cependant, que le dernier visité, Guarda, dans une altitude de 1·039 mètres, réunit plusieurs des conditions exigées, et dans le cas où le choix retombe sur lui, l'Assistance y fera un sanatorium, en deux sections, pour les riches et pour les pauvres, et selon la formule de M. Léon Petit. De cette façon la responsabilité économique de l'Assistance est seulement celle du capital employé dans la construction, et elle pourra appliquer les rentes economisées à des moyens d'une plus grande portée prophylactique. Ainsi la partie la plus philanthropique sera faite aux malades pauvres par les malades riches; les cotisations des sains seront légitimement destinées à leur préservation. J'ai dit que les dispensaires représentaient le moyen de plus grande importance, celui sur lequel l'Assistance comptait le plus. Leur construction étant à très bon marché, l'Assistance a pu se déterminer à en faire quatre pour expérience. Celui de Faro sera prêt à la fin de l'année, et on va commencer prochainement à en bâtir trois de plus, tous pareils, sur le même modèle *et selon le plan exposé dans le musée d'architecture du congrès.* Ils sont bâtis dans les villes même, mais dans des endroits isolés, et fonctionent conformément au règlement qui est traduit dans la notice que je viens vous présenter. Les dispensaires sont des centres de divulgation de la prophylaxie de la tuberculose et moyens de traitement relativement peu coûteux, qui peuvent être utilisés et sauver plusieurs malades qui ont le besoin de travailler, et qui, si on leur offrait une place dans un sanatorium, se refuseraient à laisser sa famille sans ressources pour y entrer; ils sont des écoles d'hygiène spéciale, puisque les conseils du médecin à un tuberculeux sont des leçons bien plus profitables et mieux comprises que les discours proférés en conférences d'apparat; les dispensaires faciliteront la distribution des crachoirs de poche, et peu à peu, par la suggestion que ces petits objets font dans l'esprit du public, leur utilisation sera facile et provoquera même la réclamation des crachoirs collectifs; et en Portugal il est encore réservé aux dispensaires un rôle très important. Depuis la loi de 1894 la déclaration de la tuberculose est obligatoire, mais elle est accomplie seulement en cas de mort; je n'en discuterai pas les raisons, la question est qu'elle ne s'accomplit; eh bien, les dispensaires vont rendre effective et efficace cette loi-là.

Dans le dispensaire provisoire de Lisbonne, ouvert au public depuis environ un mois et où se sont fait inscrire et se trouvent en traitement plus de 1000 tuberculeux, on a fait, sans résistance de la part des malades, systématiquement la déclaration à l'autorité: on est arrivé à faire plus de 100 désinfections dans des maisons de tuberculeux ouverts, travail qui a été d'évidente utilité. Comme l'Assistance compte dans un bref délai ouvrir des dispensaires dans presque tous les chefs-lieux du département, il est clair que dans tous ces points la loi pourra s'appliquer peu à peu: et ainsi obtenir la généralisation de son emploi. L'installation de ces dispensaires sera faite par la contribution que les municipalités payent déja pour le fond spécial contre la tuberculose. A Lisbonne le dispensaire provisoire, qu'on a fondé, sera remplacé par l'Institut, en ce moment en construction, *et dont le plan figure*

aussi dans le musée du congrès. Son nom d'Institut est justifié par le développement qu'on lui donne; outre la partie destinée aux consultations, il y aura un amphithéâtre pour conférences et cours spéciaux pour des médecins, où l'on cultivera la manière de faire un diagnostic précoce; un laboratoire de bactéréologie, non seulemeut pour aider la clinique, mais encore pour faire l'étude profonde de l'agent de la tuberculose; un établissement d'hydrothérapie et un poste de désinfection de crachoirs. À l'égard des crachoirs collectifs, je dois dire, comme épisode, une innovation utile, que l'Assistance a établi; elle a fait faire, pour les villes où la désinfection soit difficile ou douteuse, des crachoirs en métal avec une lampe en dessous, de manière qu'avant de les vider, le liquide contenu soit bouilli dans le récipient même. Il existe encore dans l'Institut des chambres pour abriter pendant 24 heures les familles pauvres dont on désinfecte les maisons. Voici en résumé comment en Portugal, sous la direction de la plus généreuse des reines, qui allie à la grande bonté du cœur la plus délicate culture d'esprit, on est en train d'établir les fondements d'une œuvre, qui tous les jours s'accroît d'importance, et maintenant marchera plus fermement, illuminée par la parole de tant d'illustres savants, qu'a su réunir ce congrès.

THE NATIONAL IMPORTANCE OF GRATUITOUS BACTERIOLOGICAL EXAMINATION.

By Dr. BEZLEY THORNE.

That pulmonary tuberculosis is a curable disease is no longer open to question, and for the purpose of this communication I take to be granted, what I believe to be the fact, that the open-air treatment, practised with the best known and attainable dietetic and hygienic precautions, is of all remediable measures the one which stands pre-eminent. The question with which I propose briefly to deal is this: Is there any one condition of such importance as to entitle it to be regarded as the dominant factor in a successful treatment? I take it that the answer must be that early recognition of the disease is that factor. If so, it remains to consider how that end may best be attained and by what means.

Koch's great discoveries of the tubercle bacillus and of the diagnostic value of the tuberculine reaction have placed in our hands two powerful weapons. The tuberculine reaction bears, however, as far as disease in the human subject is concerned, rather on precaution than cure, in that it is only on cattle designed for food or set apart for milk production that it can be extensively used as a means of diagnosis. But although, undoubtedly, prevention is better than cure—and prevention widespread and even absolute is the counsel of perfection which scientific workers must keep in view—cure is the urgent, instant question which a yearly holocaust of 60,000 wasted lives is pressing on the mind and conscience of the profession of medicine, and of the nation and the nation's rulers.

I have said that in relation to cure early detection is the dominant factor.

The large number of cases in which scars indicative of the healing of tuberculous lesions are discovered post-mortem in those who have succumbed to diseases other than tuberculosis of the lungs, and in whom there has been recorded no history of that disease, would supply incontestable evidence of its curability, even if clinical evidence were lacking, which it is not. A disease which is so largely amenable to spontaneous cure is obviously one which might be expected to yield readily to treatment—in those cases in which extensive destruction of tissue or widely-diffused secondary deposit has not already taken place.

On the other hand, we have convincing evidence that, to use the words of Dr. Sidney Martin, "lesions of tuberculosis, giving rise to few symptoms and physical signs in the early stages, are not discoverable until some time after they are formed." Thus we are confronted by the two facts that, in pulmonary tuberculosis, early recognition is surrounded by exceptional difficulty, and that, at the same time, it is the dominant factor in curative treatment, whether by the "open-air" system or by any other method.

If that be the case with regard to sufferers in general, early detection becomes more and more imperative as we descend in the scale of affluence and social position; that is, as we pass from stratum to stratum of the classes to which the open-air sanatorium as a curative agent affords the most favourable, and, perhaps, the only opportunity of saving life, and health, and wage-earning power. In fact, it would be very near the truth to say that, speaking generally, in early detection and sanatorium treatment lie the essential conditions of curative treatment among the wage-earning classes; and further, that the advantages of sanatorium treatment, beneficent as it is calculated to be, must, in a great degree, be lost apart from the primary condition of early recognition.

But that is not all. Early detection is not only a question of paramount importance in relation to curative treatment, but also as regards the no less pressing question of prevention; and here, again, the subject assumes its most urgent aspect, when we come to the wage-earner and the poor, on account of the relation they bear to their families in small and perhaps overcrowded dwellings, to fellow-workers in the workshops and factories, and to the public generally in all cases in which the worker is engaged in the production or distribution of articles of food, such as milk, meat, bread, and confectionery.

Let us now inquire at what point the subject of pulmonary tuberculosis becomes a source of greatest danger to himself and to others. It is when his sputa begin to contain and disseminate the tubercle bacillus, the one and only source of infection. From that time also his wage-earning powers diminish at an increasing rate, because, apart from the disease, anxiety and diminishing supply of food, fuel, and domestic comfort undermine the defensive powers of the patient and of those dependent on him; while the danger increases from the daily accumulating infection of handkerchiefs, clothes, bedding, walls, and floors. We know that the bacillus may maintain its vitality in the dried sputum for from eight to ten weeks, and it needs no argument to demonstrate what must be the consequent peril to fellow-workers

and to dependents, more especially if the patient has had no explicit warning as to the disposal of his sputum.

Happily it is at this point that science points the way to both prevention and cure. If from the moment that the bacillus appears in the sputum the time of greatest danger of infection has arrived, it is also from that moment that the microscope can resolve all doubt in what might, and in most cases would, be a difficult diagnosis. Early detection for practical purposes depends on early examination of the sputum. The microscope and the sanatorium must be co-workers. The recognition of the bacillus must be the patient's title to the treatment and its attendant hygienic education, and the safeguard to those around him, who would otherwise be exposed to infection. How, then, are we to ensure that the sputa of these people are to be submitted at the earliest possible moment to bacteriological investigation, the cost of which the patient himself cannot afford, and which his medical attendant probably has not the means of undertaking? There are, to their praise be it said, medical officers of health who offer opportunities of gratuitous examination, but the public-spirited action of isolated individuals will not meet the exigencies of the case. Tuberculosis claims one-seventh of the human race. It accounts for 60,000 deaths a year in these islands. The question is a national one which can and must be dealt with from a national standpoint. If vaccination is a national concern, much more is the gratuitous examination of sputa, and I may add of milk and meat, under some universally extending national organisation. Without it sanatoria will miss the mark, and death will continue to claim its hecatomb of tuberculous victims throughout the land. It is for the people, and more especially the medical profession, to press this question as one of the utmost urgency until the legislature makes national provision for gratuitous bacteriological examination.

Briefly, the points which it is desired to emphasise are: that early recognition is the essence of the curative treatment of pulmonary tuberculosis; that a positive diagnosis in early cases is difficult apart from detection of the bacillus; that the appearance of the bacillus in the sputum marks the turning point of danger to the patient and those with whom he associates; the bacteriological examination is a national concern and should be provided for by the State.

Dr. ALFRED HILLIER: Mr. President, Ladies and Gentlemen,—I am informed by the Chairman that it is now my duty to conclude this discussion on the international aspects of tuberculosis. I am sorry that some gentlemen have not taken up one or two points which I raised in this Paper. But I quite recognise that at the short notice at which this Paper has been put in their hands it has been very difficult to give the matter very much consideration. At the same time, I have in this Paper offered for your consideration certain propositions which I submit we all ought to be agreed upon, and which I also submit the scientific opinion of Europe is practically agreed upon. I am therefore going to ask you, as members of that section of this Congress whose special duty it is to advocate practical measures, to forward a Resolution for

consideration at the final meeting to be held to-morrow. The Resolution practically arises out of the paper which I have already read to you, and I will, with your permission, now submit it. It is:—

"That this Section is of opinion that a permanent International Committee should be appointed:—

"(*a*) To collect evidence and to report on the measures that have been adopted for the prevention of tuberculosis in different countries;

"(*b*) To publish a popular statement of those measures;

"(*c*) To get and publish periodically a record of the scientific research work being done in relation to tuberculosis;

"(*d*) To consider and recommend measures of prevention for the guidance and information of the Governments of States and local authorities.

"This Section is further of opinion that such a committee should consist of representatives to be elected by the great national societies formed for the suppression of tuberculosis, and also of representatives nominated by the various European Governments."

In submitting this Resolution I am not asking you to do an absolutely new thing. This idea has been brought up at various Congresses for some years past. I submit that if we are anything in this country, we are a practical people, and if we have made up our minds that a certain action is desirable, that it is our duty to recommend that action, and to suggest the lines on which such action should be taken. I suggest that a Committee, such as I have sketched in this Resolution, would be a Committee calculated to perform an extremely useful function. I think that we especially require a Committee, or some responsible body of men, whose function it is to collect the evidence and report on the measures that are being adopted in the various countries throughout the civilised world. You cannot get a reliable and authentic statement of matters of this sort unless it be some body's or person's duty to compile such a report. You get an accidental piece of information here and there at a Congress. You may get a full statement with reference to one country and a brief statement with reference to another, and none at all with reference to a third. I submit that this question, which is agitating the intelligence of the whole civilised world, is one that deserves a more organised consideration, and that a collection of evidence under the auspices of such a Committee as this would be an extremely valuable one. The second portion follows from what I have said, that "a popular statement of such evidence should be published." I think another function which such a Committee might very well fulfil is to issue and publish periodically, say annually or every six or every three months, as it may be determined, a record of scientific research work which is being carried out in relation to tuberculosis. It is well known to all of you that work is being done in the various countries of Europe, and is being from time to time published. But here again we have no authentic publication containing the best of all that is being carried on in different countries, and a great deal of overlapping work is being done without the fact being discovered. Now, in regard

to that section of my Resolution, I may say that I think it will be known to many of you that some years ago Sir Michael Foster proposed that there should be a Physiological International Society. His object in making that proposition was that there should be some body whose business it should be to take a careful note of the original physiological research work that was going on, and, by putting men in touch with one another, to enable them to co-operate and to a certain extent prevent overlapping of work. That I think is a very important piece of work which, in relation to tuberculosis, a Committee of this sort might aid in. Finally, I have said that such a Committee could consider and recommend measures of prevention for the guidance and information of Governments of States and local authorities. That is a matter that no doubt would have to be done very cautiously. I do not suppose that such a Committee would venture to go very far; but still there are certain principles to-day and certain lines of action about which we are so thoroughly agreed that unanimity might be arrived at. I do think it is time—and I hope you will agree with me—that an authentic utterance from all the civilised States of Europe was made on the spitting nuisance. If these Congresses and all these societies and other things mean anything at all, they do mean that the time has come when action should be taken to put down this nuisance and this great and grave danger to public health throughout the civilised world. They have given us a good lead in America, under the guidance of Dr. Hermann Biggs, of New York, and I think it is quite time Europe decided to come in a good second. We cannot, unfortunately, lead the way, but we can follow the magnificent example which New York has set in that matter. I have ventured to offer suggestions; but you will understand, gentlemen, that they are open to amendments, and if the Resolution is carried, as I hope it will be, it will come up again for discussion to-morrow at the General Meeting. I had to suggest something as to the constitution of such a Committee, and for the present I suggest this: "That this Section is further of opinion that such Committee should consist of representatives to be elected by the great national societies formed for the suppression of tuberculosis, and also of representatives nominated by the various European Governments." Whether or not it is desirable to suggest that the Governments should nominate members of such a Committee is an open point. On the whole I think it is, and therefore I have put that clause in. I have much pleasure in formally moving the Resolution.

Dr. Newsholme (Brighton): I have very much pleasure in seconding this Resolution. It appears to me that everyone will agree as to the desirability of collecting every possible information as to what is being done by all the civilised countries in regard to tuberculosis, and that that information should be made as widely available as possible. I should like to mention that while this morning we are emphasising the splendid work which is being done abroad in this connection, I think it is desirable that statements should be made by a *confrère* of Dr. Niven to the effect that in 1893, in Oldham, action was proposed by him which has practically been the founda-

tion of everything which has subsequently been done, and although that action was not brought to an issue in actual practice, owing to the Town Council not endorsing the resolutions proposed, yet Dr. Niven was the pioneer who started a great deal of what has been subsequently done. I have great pleasure in seconding the Resolution.

DR. COOPER PATTIN (Norwich): I wish to move a very brief amendment, namely, that the word "European" be deleted between "various" and "Governments." Dr. Hillier himself told us that we are indebted to the United States for the best downright practical methods of prevention that have yet been adopted. Therefore I should like to know why he proposes to restrict representatives of the various Governments to those of Europe. For instance, I have a number of relatives in Australasia.

DR. HILLIER: I am asked by the Chairman to express my cordial acceptance of that proposition. I have not the slightest desire to confine the resolution to Europe. If America will join hands in the matter I shall be delighted. Perhaps what was running in my mind was that we were rather closer together in Europe, and that it would be a little outside practical politics for some reasons to suggest that the United States should come in; but I should only be too delighted if other great Powers and civilised communities will join us in such a league as I have suggested.

DR. PATTIN: That meets exactly what I wish to bring forward. I do not wish this resolution to be restricted even to the European and American Governments. It is quite probable that we may have something to learn upon this matter from the Chinese, and I for one would like all Governments included.

The Resolution, with the omission of the word "European," was then put and carried unanimously.

L'ÉTAT ACTUEL DE LA CROISADE CONTRE LA TUBERCULOSE HUMAINE DANS LES DIVERS PAYS.

PAR M. LE DR. VAN RYN (*Bruxelles*).

LA tuberculose est un fléau universel. Aucun coin habité de notre planète n'échappe à ses atteintes; il n'est aucune race humaine qui ne lui paie un tribut plus ou moins lourd; les seules et rares populations qui en sont indemnes jusqu'ici sont celles qui habitent des régions lointaines ou de grandes altitudes, et qui n'ont pas de rapports directs ou indirects avec les peuples civilisés, ou soi-disant tels.

Il est donc très naturel que partout l'on songe à s'armer contre un mal qui, chaque année dans le monde entier, fauche trois millions d'existences, en admettant une population globale d'un milliard et demi d'individus. Ce

chiffre, vraisemblablement exact, représente au moins quinze millions de personnes en puissance de tuberculose.

Avant de connaître la vraie nature de la tuberculose, on était pour ainsi dire désarmé devant ses ravages. Mais depuis que sa contagiosité fut demontrée par Villemin en 1867, et surtout à partir de 1882, lorsque Koch eut découvert le véritable agent, le bacille de la tuberculose, on se mit à étudier dans quelles circonstances la maladie se transmet, et de quelle façon on pourrait l'éviter. On savait depuis longtemps qu'elle est susceptible de guérir.

En possession de ces trois données fondamentales, à savoir que la phtisie est contagieuse, évitable et curable, les médecins se mirent à l'œuvre et entreprirent de les faire pénétrer dans l'esprit du public. Ainsi naquirent les Ligues et les Œuvres contre la tuberculose, et la propagande en faveur des dispensaires et des sanatoria. Le mouvement a gagné de proche en proche tous les pays civilisés, et promet de prendre des proportions grandioses justifiées par la réelle gravité de la situation.

Puisqu'il s'agit d'une calamité commune à toutes les contrées, il est nécessaire de donner à la lutte un caractère international qui la rende réellement efficace. Un vœu dans ce sens a été exprimé dans plusieurs Congrès antérieurs et a été suivi d'un commencement d'exécution, puisqu'un *Bureau international pour la lutte contre la tuberculose* est en voie d'organisation à Berlin. Je souhaite à mon tour qu'on persévère dans cette heureuse voie.

L'esquisse que j'ai l'honneur d'exposer ici permettra de se rendre compte de ce qui se fait actuellement dans les divers pays en vue d'enrayer la propagation de la tuberculose humaine. Ma revue sera forcément incomplète, mais grâce à l'obligeance de mes correspondants, à qui j'adresse ici l'expression de ma vive gratitude, elle comprendra néanmoins un nombre de faits suffisant pour donner une idée des efforts tentés dans les vingt-sept pays considérés.

Je commence par les contrées d'Europe.

ALLEMAGNE.

La propagande contre la tuberculose est largement assurée en Allemagne. Sans compter le rôle important que jouent dans cet ordre d'idées les sanatoria, dont je parlerai tout à l'heure, plus d'un million de brochures contenant des instructions populaires sur la phtisie, sa nature, sa contagiosité, et sa prophylaxie, ont été répandues dans le public par les soins de l'*Office impérial de Santé*, de diverses Sociétés d'assurance ouvrière et de Sociétés pour la création de Sanatoria. De nombreuses conférences de vulgarisation sont organisées dans tout l'Empire.

La propagande s'exerce dans tous les milieux : on crée de plus en plus des médecins inspecteurs d'écoles, qui éveillent le sens des questions hygiéniques dans le corps enseignant et dans les familles, qui peuvent signaler à temps les enfants dont la santé exige le séjour dans des institutions sanitaires ; ces

médecins font un choix judicieux des enfants désignés pour les colonies scolaires; ils donnent d'utiles avis au point de vue du choix d'une carrière appropriée à la vigueur des jeunes gens.

Beaucoup de communes remettent à tous leurs écoliers les instructions populaires de l'Office impérial de santé; et quelques unes également l'excellent ouvrage de Knopf, couronné au dernier Congrès de Berlin.

On s'efforce d'améliorer les habitations ouvrières; on en construit de plus en plus, c'est ce que font entr'autres les sociétés d'assurance: elles bâtissent elles-mêmes ou bien elles prêtent jusqu'à 100 % de la valeur des immeubles à 3 % + 1 % d'amortissement.

Les industriels montrent un louable souci de veiller à l'hygiène des ateliers par l'aération, la suppression du balayage à sec; dans beaucoup d'ateliers, d'écoles, de salles de réunion ou d'attente, on enduit les plancher d'une huile spéciale (huile *dustless*).

La désinfection des logements contaminés se fait sur une vaste échelle, par les industriels pour les ateliers et maisons ouvrières, ou par les communes pour les indigents. On s'efforce d'isoler les phtisiques pauvres dans des chambres séparées de leur habitation; beaucoup d'industriels même font construire des maisons ouvrières comprenant une chambre séparée, toujours très bien située, pour les tuberculeux.

Les pouvoirs publics interviennent énergiquement dans la prophylaxie de la tuberculose.

Une circulaire du Ministre des Cultes, de l'Instruction publique, etc., de Prusse, circulaire datée de décembre 1897, recommandait à toutes les autorités de répandre partout l'usage des étuves à désinfection et des crachoirs, de favoriser la création de sanatoria populaires, et entr'autres de sanatoria spéciaux pour les aliénés tuberculeux, d'établir la déclaration obligatoire au moins des locaux où sont décédés des tuberculeux, et de les faire désinfecter; de veiller à la désinfection dans les cas de phtisie surtout, dans les hôpitaux, hospices, asiles d'aliénés, prisons, etc; de faire connaître au public par la voie de la presse, des comités de propagande et des médecins, que l'emploi de personnes qui toussent beaucoup, comme vendeurs de substances alimentaires, n'est pas sans danger.

Depuis avril 1898 on applique une Ordonnance du Ministre des Travaux publics de Prusse, concernant le nettoyage et la désinfection des wagons de voyageurs, salles d'attente, quais et autres locaux des chemins de fer, ainsi que le placement de crachoirs et la défense de cracher sur le sol dans ces voitures et ces locaux. Cette ordonnance est très précise et très sévère.

De plus la Direction des Chemins de fer prussiens, voulant autant que possible mettre son personnel à l'abri des atteintes de la phtisie, n'accepte que les candidats indemnes, non prédisposés, et sans hérédité morbide sérieuse. Elle améliore le logement de ses employés; elle leur distribue des Instructions populaires sur la tuberculose et supprime dans la mesure du possible tout danger de contamination; elle défend notamment l'emploi de cornets servant à plusieurs ouvriers à la fois. Conformément aux prescriptions ministérielles, elle nettoie les wagons de chemin de fer au moyen d'une

solution de soude et d'eau phéniquée; elle désinfecte périodiquement les coussins au moyen de la vapeur. De plus la Compagnie a décidé de construire deux sanatoria spéciaux pour ses employés et ouvriers tuberculeux.

En Saxe l'intervention officielle est plus sévère.

Une circulaire du Ministre de l'Intérieur, datée de septembre 1900, recommande aux autorités de vulgariser dans la plus large mesure possible les notions sur la tuberculose et sa prophylaxie; les Instructions de l'Office impérial de Santé doivent être affichées, et des crachoirs placés dans tous les lieux publics, bureaux, écoles, fabriques, ateliers, hôpitaux, hospices, cafés, hôtels, et on interdira de cracher sur le sol dans tous les endroits ainsi que dans les trams et omnibus.

Les localités importantes devront se munir d'appareils à désinfection et d'un personnel au courant de ces opérations. Dans les hôpitaux et hospices, on ne laissera pas des personnes bien portantes employer les vêtements et les literies de tuberculeux sans avoir été désinfectés. On préviendra, par persuasion ou au besoin par des règlements *ad hoc*, la contagion tuberculeuse, qui peut se produire dans les rapports du public avec des sages-femmes, infirmiers, institutrices, surveillantes de crèches, et avec des marchands de comestibles ou de lait.

Les Ministres de la Justice, des Cultes, des Finances, de la Guerre, invités à coopérer à cette lutte par des mesures prises dans leur ressort, se sont empressés de se conformer à la demande de leurs collègues.

Le même mois, une seconde circulaire du Ministre de l'Intérieur de Saxe prescrit la déclaration obligatoire avant l'inhumation, par les veilleuses des morts (*Leichenfrauen*) de tout décès dû à la tuberculose. Les médecins doivent avertir la police par ecrit lorsqu'un malade atteint de phtisie pulmonaire ou laryngée grave, change de demeure, ou bien est susceptible de créer de sérieux dangers à son entourage, par suite de mauvaises conditions d'habitation.

Tous les cas constatés dans les hôpitaux privés, orphelinats, hospices, asiles, hôtels, maisons de logement, cafés, pensionnats, etc., doivent être signalés par écrit à la police endéans les trois jours après qu'on en a eu connaissance, soit par le médecin, soit à son défaut par le tenancier ou le directeur de l'établissement.

Les autorités policières doivent, dans tous les cas qui leur sont notifiés, assurer la désinfection du domicile du malade et de tout ce qui s'y trouve. En cas de décès, cette désinfection doit être faite aussitôt après l'inhumation ou le transfert du corps au dépôt mortuaire; en cas de simple maladie, elle se fera de suite après le départ du malade.

Les infractions à ces prescriptions sont punies d'une amende allant jusqu'à 150 mk., ou d'une peine de six semaines de prison au maximum.

Voilà ce qui se fait en Allemagne en matière de prévention de la phtisie. Passons au côté curatif.

Nous voyons celui-ci prendre une extension extraordinaire; l'Allemagne possède à elle seule presqu'autant de sanatoria que tous les autres pays réunis! Il est vrai qu'elle seule possède un rouage qui lui permet d'occuper un

rang exceptionnel; je veux parler de l'assurance contre la maladie et la vieillesse, assurance obligatoire pour les ouvriers et employés gagnant moins de 2000 mark par an.

Les nombreuses sociétés d'assurance constituées dans ce but ont le droit d'entreprendre le traitement de leurs affiliés malades; elles ont bientôt reconnu que pour les tuberculeux principalement, elles avaient un avantage matériel à les soigner dans des sanatoria construits par elles-mêmes fût-ce à grands frais. En guérissant les malades, ou tout au moins en leur restituant la capacité au travail, elles évitent de devoir leur payer pendant un, deux, ou trois ans la rente d'invalidité, et réalisent de ce chef, même en tenant compte des sommes considérables que coûtent les bâtiments et l'entretien des malades, une importante économie. Ainsi s'explique l'essor prodigieux qu'a pris en Allemagne le développement des Sanatoria.

Mais il n'y a pas que les sociétés d'assurance qui en construisent; un bon nombre sont créés au moyen de fonds recueillis par des sociétés particulières, auxquelles le gouvernement accorde facilement la personnification civile, ou bien par des industriels pour leurs ouvriers, ou par des communes ou groupes de communes, des districts, des provinces, par l'État; en dernier lieu, le Gouvernement impérial lui-même a été sollicité d'intervenir par voie de subsides, et tout permet de croire que cette demande sera favorablement accueillie.

La plus importante des associations fondées dans le but de favoriser ce mouvement est le *Deutsche Central Comite zur Errichtung von Heilstätten für Lungenkranke*, sous le protectorat de S. M. l'Impératrice d'Allemagne, et la présidence du Comte von Posadowsky-Wehner, Ministre de l'Intérieur; son distingué Secrétaire-général est le Dr. G. Pannwitz.

Le Comité Central a jusqu'à présent distribué 815,000 mark environ (plus d'un million de francs) en subsides aux diverses œuvres ayant pour but d'établir des Sanatoria dans tout l'Empire.

Ses ressources principales sont: les cotisations de ses membres, des dons, et le produit de loteries autorisées par le Gouvernement.

Pour donner une idée de l'importance des efforts qui font en quelque sorte surgir de terre les Sanatoria, et sans entrer dans une trop longue énumération, je me contenterai de citer quelques chiffres.

En 1901 il existe en Allemagne quarante-trois asiles populaires en activité. Endéans cette même année on en inaugurera dix-neuf nouveaux, et seize autres sont en construction ou seulement à l'état de projets; en outre seize établissements payants acceptent des malades peu fortunés.

Bientôt donc il sera possible de traiter chaque année 20,000 malades indigents, à raison de quatre par an et par lit. Le tout aura coûté environ 40,000,000 de mark.

Comme point de comparaison, je signalerai que dans tous les autres *pays réunis il n'y a que quatre-vingt-dix-neuf Sanatoria!*

Mais on ne se contente pas en Allemagne de soigner les tuberculeux dans de superbes établissements, on veille encore à ce que leurs familles puissent subsister pendant la durée du traitement. Ce n'est pas encore tout: après la cure il est souvent impossible au patient de reprendre son

métier, aussi des comités spéciaux s'occupent-ils de placer les anciens malades. Enfin, on préconise la création de Colonies agricoles où les tuberculeux pourraient exercer, après la cure, une profession lucrative et compatible avec leur état de santé.

D'autres institutions encore ont été créées en Allemagne pour venir en aide aux indigents phtisiques. Dans les villes universitaires on a organisé des policliniques-dispensaires, conformément aux idées émises par Calmette en France et par Fränkel en Allemagne. Dans ces dispensaires, on fait le diagnostic précoce de la tuberculose par tous les moyens d'investigation, on choisit les malades auxquels une cure au sanatorium peut être conseillée, éventuellement on entreprend le traitement complet; on règle le régime et l'existence des intéressés, on leur donne des conseils et le cas échéant on les aide; le côté d'assistance réelle des dispensaires est plutôt accessoire en Allemagne : ce sont plutôt des offices de diagnostic et de traitement.

A Berlin la Policlinique royale, dirigée par le professeur Max Wolff, a été visitée du 15 novembre 1899 au 15 novembre 1900, par 4,403 malades, ce qui démontre bien la grande utilité de ces organismes. Aussi en a-t-on créé ou a-t-on le projet d'en créer en annexe aux universités de Greifswald, Breslau, Halle, Kiel, Göttingen, Francfort, Bonn, Marburg; aux hôpitaux de Wiesbaden, Heidelberg, Strasbourg, Hagenau, Stettin, etc.

Dans les hôpitaux ordinaires, on cherche à réaliser le plus possible le traitement des phtisiques séparément des autres malades, soit en construisant des pavillons spéciaux soit en leur réservant des salles. On construit même des hôpitaux suburbains pour les gens atteints de tuberculose ou d'autres maladies chroniques, afin de débarrasser les hôpitaux urbains et de placer en même temps ces malheureux dans de meilleures conditions d'hygiène.

Il existe encore des *Erholungsstätten*, sorte de parcs de cure; en un lieu bien situé, à proximité d'une grande ville, dans un bois, on installe des baraques mobiles où des convalescents, y compris des tuberculeux, passent la journée du matin jusqu'au soir; moyennant une somme minime on sert du lait et des repas légers. Les phtisiques reçoivent gratis un crachoir et des instructions sur leur maladie.

L'Association de la *Croix-rouge* a fait une de ces installations près de Berlin, et se propose d'en établir encore ailleurs.

Il me sera permis de conclure cet aperçu, dont la longueur témoigne de l'activité de l'Allemagne en matière de prévention de la tuberculose, en proclamant que c'est sans conteste ce pays qui a fait le plus pour chercher à effacer la tuberculose du cadre de la nosologie.

ANGLETERRE.

S'il est vrai que l'Allemagne peut s'enorgueillir de la façon dont elle combat la tuberculose, l'Angleterre à son tour peut être fière d'avoir, avant toute autre nation, pris contre ce fléau des mesures prophylactiques dont l'efficacité est démontrée par le fait que la mortalité par tuberculose a diminué de 45 °/₀ depuis un demi-siècle. Il y a plus de cinquante ans, en

effet, que l'Angleterre possède des hôpitaux d'isolement et des sanatoria pour les phtisiques : Londres seul en a quatre depuis trente ans. Il existe également dans ce pays une judicieuse réglementation concernant l'encombrement des ateliers et des habitations.

Dès 1836 la loi sur les *building societies* favorise la construction de maisons ouvrières ; diverses lois (1852–66–74) donnent plus tard aux autorités le droit d'inspecter les maisons ouvrières et fixent des amendes pour les infractions constatées.

De 1868 à 1882 sont promulgués les *Torrens' Acts*, qui permettent la réparation et la démolition des habitations insalubres et la démolition des bâtiments qui enlèvent l'air et la lumière d'autres maisons et en empêchent la ventilation.

Un généreux philanthrope, *Peabody*, consacra plus de 500,000 livres sterl. à la construction d'habitations saines, mises à la disposition des travailleurs pauvres moyennant un loyer minime. J'y ajouterai l'œuvre de Miss Octavia Hill, et une société organisée par des ouvriers il y a trente-cinq ans et qui possède actuellement 6,000 maisons.

L'heureuse influence que ces deux facteurs, hôpitaux spéciaux et législation ouvrière, ont eue sur la fréquence de la phtisie, prouve à l'évidence combien celle-ci est facile à influencer ; elle prouve aussi, me dira-t-on, qu'elles ne suffisent pas à supprimer la tuberculose. C'est vrai, mais en présence de ce que nous voyons ici quels résultats n'est-on pas en droit d'attendre d'ici quelques années, de l'ensemble des mesures que l'on met en œuvre dans le monde entier ?

L'Angleterre s'est également mise à la besogne, et depuis la fondation de la *National Association for the Prevention of Consumption*, en 1898, la propagande générale a pris une réelle extension. Cette société est placée sous le patronage de S. M. le Roi d'Angleterre et sous la présidence de Sir William Broadbent. Elle fait preuve de la plus grande activité, elle répand à profusion d'excellents tracts de propagande ; elle organise des conférences, elle publie des articles dans la presse ; elle a d'ailleurs son organe officiel, *Tuberculosis*, très intéressant, et auquel collaborent de nombreuses sommités médicales anglaises.

Elle a également pour but de favoriser et d'entreprendre la création de sanatoria populaires. Elle compte dans tout le Royaume-Uni une trentaine de sections. Ce qui caractérise la croisade anti-tuberculeuse en Angleterre, c'est que, de propos délibéré, on ne cherche pas à lui donner un caractère coërcitif, on veut autant que possible se passer de mesures législatives contre la phtisie, on attend presque tout de la persuasion et de la bonne volonté de tous. Et de fait, l'Anglais, par son éducation, saisissant et appréciant rapidement les grands problèmes d'hygiène, se prête de très bonne grâce à ce qu'on attend de lui, et l'on obtient ici, spontanément, des résultats qu'on aurait peine à obtenir ailleurs au moyen d'une législation sévère.

Ainsi dans beaucoup de localités les médecins déclarent volontairement, parfois moyennant une légère indemnité, les cas de tuberculose qu'ils constatent et les décès, ce qui permet aux autorités de faire faire une désinfection sérieuse qui est généralement acceptée sans difficulté.

La plupart des sociétés de chemin de fer défendent de cracher dans les wagons et dans les gares.

La "National Association," travaille à faire donner dans les écoles des cours d'hygiène et de prophylaxie de la tuberculose; à faire écarter des écoles les enfants atteints de la maladie. Son action pénètre dans tous les milieux, et grâce à l'appui et au dévouement des personnalités éminentes qui la dirigent, il est certain que ses efforts seront couronnés de succès.

A la suite du mouvement d'opinion qu'elle a provoqué, la création de sanatoria a pris un essor aussi rapide que considérable. Les chiffres suivants le montrent.

En Angleterre il existe actuellement 11 sanatoria populaires et 12 hôpitaux pour tuberculeux; plus 26 établissements payants.

En Écosse il y a 2 sanatoria gratuits et 3 payants.

En Irlande 2 gratuits et 1 payant.

Au total pour les Îles Britanniques réunies: 27 établissements gratuits et 30 payants; en outre neuf autres sanatoria sont en construction ou en projet.

Ils sont presque tous créés au moyen de fonds recueillis par des sociétés privées, et dans certains cas avec l'appoint de subsides des pouvoirs publics.

AUTRICHE.

Dans ce pays peu de chose a été fait jusqu'à présent quant à la propagande générale: l'œuvre du sanatorium d'Alland est la seule qui distribue gratuitement au public des instructions et des affiches sur la tuberculose.

Quant aux mesures édictées par le gouvernement, on ne signale qu'une circulaire du Ministre des Chemins de fer prescrivant de placer dans tous les wagons de chemin de fer des avis défendant de cracher; les voitures conduisant les voyageurs dans les endroits de cure pour les maladies de poitrine doivent être munies de crachoirs contenant de l'eau; le plancher des wagons de 3e classe doit être nettoyé périodiquement à l'eau phéniquée.

Grâce à l'initiative et à la ténacité du professeur von Schrötter, de l'Université de Vienne, l'Autriche possède depuis 1898 à *Alland*, dans le *Wienerwald*, un superbe sanatorium populaire qui, après achèvement complet, comprendra 300 lits. La création d'un établissement semblable, mais de dimensions plus modestes, est décidée à Trieste; les travaux préliminaires sont terminés.

Des comités se sont formés pour étudier l'établissement d'un sanatorium à Prague, et de deux autres en Bohème, l'un à Mähren, et l'autre (tchèque) à Steiermark.

Récemment, le Gouvernement et l'Œuvre de la Croix-Rouge ont décidé de créer partout dans le pays de petits établissements en utilisant les baraquements système Döcker.

Un comité s'est constitué à Vienne dans le but d'établir un sanatorium pour malades aisés, et enfin il est question d'en organiser un à Graz avec le concours d'une société d'assurances contre les accidents.

BELGIQUE.

On ne s'occupait guère en Belgique de prophylaxie de la tuberculose humaine avant la fondation de la *Ligue nationale belge contre la tuberculose;* en 1895 cependant le Gouvernement avait chargé le Conseil supérieur d'hygiène de rédiger des *Instructions pratiques pour prévenir et combattre la tuberculose.* Ces instructions furent distribuées à un grand nombre d'exemplaires, mais, malgré et peut-être à cause de leur caractère très scientifique, leur utilité fut assez faible parcequ'elles n'arrivaient pas jusqu'au grand public.

La *Ligue nationale contre la tuberculose* fut fondée en 1898 par la *Société royale de Médecine publique*, et devint autonome à la fin de l'année 1899. Elle compte actuellement 4,000 membres. Elle est divisée en neuf Sections, une par province, dont la plupart se sont adjoint un Comité de Dames. Elle est dirigée par un Comité-Directeur, composé en majeure partie de délégués des sections provinciales. Son premier président fut M. le Dr. Félix.

L'année 1900 a été consacrée à la propagande, et je puis affirmer que toutes nos sections ont rivalisé de dévouement et de zèle. Il a été distribué gratuitement dans toute la Belgique 200,000 brochures, tracts et notices de vulgarisation, en langue française, 129,000 en langue flamande; 5,000 pancartes et affiches ont été apposées dans les rues de quelques localités, dans les lieux publics, ateliers, etc. Plusieurs centaines d'articles ont été gracieusement reproduits par la Presse, qui ne nous marchande pas son précieux appui. De nombreuses conférences, presque toujours accompagnées de projections lumineuses, ont été données un peu partout.

Notre active propagande a réussi à éveiller l'attention publique; aussi avons-nous vu de différents côtés proposer et adopter des mesures préventives contre la phtisie. J'en citerai les plus intéressantes : dans maints hôpitaux les tuberculeux sont logés dans des salles ou des pavillons séparés, notamment à Anvers, et dans certains faubourgs de la capitale. Le Conseil des Hospices à Bruxelles a fait installer à hauteur du toit, sur une terrasse de l'Hôpital St. Jean, une galerie couverte où les tuberculeux jouissent des bienfaits de la cure d'air; d'après les rapports de MM. les professeurs Stiénon et Destrée, les résultats thérapeutiques obtenus jusqu'ici ont dépassé l'attente, malgré la situation défectueuse, au cœur d'une grande ville et malgré la nature d'ordinaire peu favorable des cas de tuberculose qui forment la clientèle des hôpitaux.

L'Administration de la Caisse générale d'Épargne et de Retraite a droit à une mention spéciale : à la demande de M. Lepreux, Directeur-général, M. le Dr. Mahillon, médecin de la Caisse, a établi une série d'excellentes mesures prophylactiques : nettoyage fréquent par voie humide, et ventilation des bureaux et des locaux accessibles au public; défense formelle de cracher sur le sol; usage de crachoirs communs et individuels, désinfection périodique des livrets d'épargne, etc.

La *Ligue contre la tuberculose* s'occupe sérieusement de l'assistance aux indigents tuberculeux; tout en recommandant la création de Sanatoria populaires qu'elle n'est pas en état d'organiser elle-même en ce moment, faute

de posséder la personnification civile, la Ligue a déjà établi deux *dispensaires gratuits*, l'un à Namur, l'autre à Mons.

Dans nos dispensaires on examine les malades, on y dépiste les tuberculeux dès les premiers symptômes; on fait l'analyse de leurs crachats, de leur urine. En même temps une enquête discrète au domicile de l'intéressé, renseigne le comité du dispensaire sur les conditions dans lesquelles il vit au point de vue de l'hygiène, sur ses ressources, etc. On donne aux malades d'utiles conseils sur la manière dont ils doivent se soigner, organiser l'hygiène de leur habitation, les précautions qu'ils doivent prendre pour ne pas communiquer leur mal à leur entourage. On leur remet gratis un crachoir de poche, et le cas échéant on leur fournit une chaise-longue, on leur donne du lait stérilisé (un litre par jour), ou d'autres aliments fortifiants, mais on laisse aux médecins particuliers des malades le traitement médicamenteux. Dans les cas les plus favorables, le comité du dispensaire envoie à ses frais des malades faire une cure d'air de deux ou trois mois à la campagne chez des personnes qui, moyennant rétribution, consentent à leur donner logement et nourriture. Le traitement est surveillé par le médecin de l'endroit.

Parfois encore, le dispensaire vient en aide à la famille des malades pendant le traitement; il se met en rapport avec les patrons pour obtenir d'eux des secours pour leurs assistés, ou du travail après leur cure.

En dehors de ceux qui fonctionnent déjà à Mons et à Namur, un dispensaire s'ouvrira cette année à Tournai, puis à Charleroi dans le Hainaut; Bruxelles possédera bientôt le sien; d'autres sont à l'étude à Gand, à Anvers, à Bruges, à St. Trond.

Les ressources nécessaires proviennent des souscriptions de nos membres, de subsides des pouvoirs publics (provinces, communes), de dons de généreux philanthropes. S.A.R. le prince Albert ayant, dans une noble et charitable pensée, décidé de consacrer la somme recueillie par souscription nationale à l'occasion de son mariage avec la gracieuse princesse Elisabeth de Bavière, par moitié à la Caisse des accidents du travail et à la lutte contre la tuberculose, la Ligue nationale a reçu une part importante de ce subside, augmentée d'un don personnel du prince. Cette précieuse libéralité nous aidera à créer nos dispensaires. A Mons, M. R. Warocqué a fait don au dispensaire d'une somme de 100,000 fr.

En dehors de la Ligue nationale il existe dans la province de Liége une *Œuvre liégeoise des tuberculeux*, qui a pour but principal de créer également des dispensaires dans la province. L'Œuvre est présidée par M. le prof. Putzeys, son dévoué secrétaire-général est M. le Dr. Malvoz, directeur du Laboratoire provincial de bactériologie de Liége.

Le dispensaire de Liége, organisé au moyen de fonds provenant de subsides de la province et de la ville, de cotisations des membres de l'Œuvre et de dons de philanthropes généreux, notamment de M. le sénateur Montefiore-Levi, est le premier que notre pays ait vu s'ouvrir. Il a d'ailleurs servi de modèle à ceux de la Ligue, et il est lui-même établi selon les idées du prof. Calmette, le très distingué directeur de l'Institut Pasteur de Lille.

Deux autres dispensaires de *l'Œuvre des tuberculeux* s'ouvriront bientôt à

Huy et à Verviers, de sorte qu'avant un an la Belgique en possédera douze en tout.

Le Gouvernement, malgré son désir, ne peut guère, en vertu de la législation sanitaire actuellement en vigueur en Belgique, participer à la croisade antituberculeuse, autrement qu'en appelant l'attention des autorités provinciales et communales, des administrations de bienfaisance, sur les ravages de la tuberculose et en leur suggérant les mesures propres à les enrayer. La nouvelle loi sanitaire en préparation permettra au Gouvernement d'intervenir plus directement.

En attendant, M. Beco, l'éminent Secrétaire-Général du Ministère de l'Agriculture, toujours prêt à mettre son influence éclairée au service du progrès en matière d'hygiène et de mesures d'utilité publique, a prié le Conseil supérieur d'hygiène de rédiger des Instructions détaillées pratiques sur toutes les maladies infectieuses ou parasitaires, et sur les précautions à prendre pour s'en préserver. Ces Instructions, destinées à être répandues à un très grand nombre d'exemplaires, paraîtront bientôt et formeront un recueil très complet qui rendra les plus grands services à l'hygiène publique : un chapitre y est naturellement consacré à la tuberculose. Une publication de ce genre, embrassant l'ensemble des maladies infectieuses et parasitaires, n'existe encore, je crois, dans aucun pays.

Plusieurs provinces accordent des subsides annuels à la Ligue nationale. La province de Liége a le mérite d'avoir, la première dans notre pays, adopté des mesures prophylactiques contre la phtisie, et d'avoir décidé, il y a deux ans, la création d'un Sanatorium provincial pour les tuberculeux indigents ; les bâtiments, qui coûteront plus d'un million de francs (pour 100 lits), sont en construction. En même temps qu'elle crée la Sanatorium, la province fonde une caisse provinciale destinée à faciliter l'octroi de secours aux familles des malades pendant la cure. Les charges qu'imposent au Gouvernement provincial la construction du Sanatorium et le traitement des malades, seront fortement allégées par la munificence d'un de nos philanthropes les plus distingués dont la générosité s'est déjà manifestée à de fréquentes reprises au profit de la lutte antituberculeuse, M. le Sénateur Montefiore-Levi, fondateur du célèbre Institut d'électricité qui porte son nom à Liége, et de l'Hospice des Enfants convalescents à Esneux. Il a fait don à la province de Liége d'une somme de 300,000 francs.

Le Brabant a décidé de ne pas construire d'établissement provincial, mais de subsidier largement les communes ou les associations de communes qui voudront créer des sanatoria. La province a décidé en outre d'appliquer, dans son ressort, une série de sérieuses mesures de prophylaxie à l'égard de la phtisie.

La province de Hainaut est décidée à construire un asile provincial dont le coût est estimé à 1,000,000 de francs environ pour 100 lits.

La ville de Bruxelles possédera bientôt son Sanatorium, grâce à la libéralité d'un de nos plus grands philanthropes, M. Georges Brugmann, qui a légué aux hospices une somme de 5,000,000 de francs destinée à la construction d'un établissement de 100 lits et aux frais de traitement des malades.

Enfin un groupe de communes de l'agglomération bruxelloise a mis à l'étude, sur la proposition de M. Van den Putte, échevin de la commune de Schaerbeek, l'établissement d'un sanatorium intercommunal.

Le mouvement antituberculeux, ainsi qu'on le voit, prend en Belgique une réelle extension; notre pays peut désormais revendiquer sa place parmi les nations qui travaillent avec énergie à détruire la tuberculose.

BULGARIE.

En Bulgarie de nombreuses pétitions adressées au parlement demandent que le gouvernement entreprenne lui-même la construction de nombreux asiles de tuberculeux, comme il le fait pour d'autres établissements hospitaliers. Le gouvernement bulgare s'est empressé d'envoyer un médecin attaché à l'administration centrale, étudier l'état de la question dans les pays étrangers, et spécialement en Allemagne.

DANEMARK.

La lutte contre la tuberculose humaine a commencé en Danemark il y a six ans sur l'initiative du Dr. Saugman, par la distribution gratuite d'instructions sur la tuberculose (plus de 600,000 exemplaires). Une Ligue nationale contre la tuberculose s'est fondée en janvier de cette année.

Quant à l'intervention du Gouvernement, je signalerai un projet de loi, encore à l'étude, sur la désinfection obligatoire après décès par tuberculose. Le Dr. Rördam, député, a déposé une autre proposition concernant les mesures générales à prendre contre la tuberculose; mais il est douteux qu'elle soit admise, en raison de son caractère trop restrictif de la liberté individuelle.

Il est défendu de cracher dans les voitures de chemins de fer, trams, etc.

En fait de sanatoria le Danemark ne possède jusqu'ici que le bel établissement de Vejlefjord, pour malades payants, dirigé par le Dr. Saugman et créé par la *Société des médecins danois;* cet établissement, qui consacre une partie de ses bénéfices au traitement de malades pauvres, a reçu de l'État une contribution de 138,000 frs.

De pressantes démarches sont faites auprès du gouvernement pour qu'il prenne à sa charge la construction d'asiles pour les indigents phtisiques: la société des médecins danois lui a présenté une pétition revêtue de plus de 100,000 signatures; récemment un groupe de députés lui a derechef adressé une pétition couverte de 300,000 signatures, mais jusqu'ici il n'ose pas assumer une charge aussi importante.

La ville de Copenhague a voté 800,000 frs. pour la construction à Boserup d'un asile populaire de 116 lits; l'ouverture aura lieu cette année même.

Pour les enfants scrofuleux il existe depuis 1875 un hôpital maritime et quelques colonies maritimes au bord de la mer.

ESPAGNE.

Grâce à l'active campagne menée par le Pr. Moliner, de Valence, un sanatorium pour les pauvres existe actuellement à Porta-Coeli, dans un ancien couvent. L'asile, placé sous le protectorat de LL.MM. le Roi et la Reine d'Espagne, a été établi grâce à un important subside du gouvernement et au produit d'une souscription nationale.

La création d'une Ligue contre la tuberculose est à l'étude.

FRANCE.

Il y a quinze ans déjà, le professeur Verneuil fondait l'Œuvre de la Tuberculose et attirait l'attention du public sur les ravages de la tuberculose et sur la nécessité de les combattre. Son appel rencontra peu d'écho; en 1889 même l'illustre Villemin ayant présenté à l'Académie un projet *d'Instructions* contre la phtisie, fut plutôt mal accueilli par ses collègues.

Bientôt cependant le réveil se fait: en 1891 le Prof. Armaingaud, de Bordeaux, fonde la *Ligue contre la tuberculose*, qui entame sur le champ une vigoureuse propagande au moyen de conférences, de publications populaires, d'articles dans la presse, etc.

Vers cette époque déjà la ville de Paris fait gratuitement désinfecter sur demande les habitations où il y a eu un décès par tuberculose.

Ce n'est cependant que dans ces dernières années que le mouvement antituberculeux a pris en France une sérieuse extension: de nombreux comités de propagande se sont formés à Lille, à Nancy, dans le Loiret, à Bois-Colombes, Semur, à Paris, où la plus récente est *l'Œuvre de préservation contre la tuberculose par l'éducation populaire*. En 1896 le Directeur de l'Assistance publique charge une commission spéciale, présidée par le Prof. Brouardel, d'étudier la question. Les rapporteurs de la Commission, MM. Grancher et Thoinot, dans un remarquable travail, préconisèrent une série d'excellentes mesures: isolement des tuberculeux dans les hôpitaux; éducation du personnel hospitalier, hygiène des habitations, assistance à domicile des phtisiques indigents; distribution d'instructions prophylactiques dans les familles où il y a des malades; défense de cracher, placement de crachoirs, création de sanatoria, etc. (L'isolement dans les hôpitaux se pratique déjà à Besançon depuis 1893, plus récemment au Havre et à Paris—hôpitaux Boucicaut et Lariboisière.)

En 1897 le Conseil municipal de Paris vote un crédit de 6,000,000 de francs à consacrer par l'Assistance publique à l'application des réformes proposées par Grancher et Thoinot.

En 1898 l'Académie s'occupe de nouveau de la tuberculose, et cette fois, mieux inspirée qu'en 1889, elle approuve et recommande la mise en pratique de toutes les mesures préventives connues.

En Octobre 1899 le Gouvernement lui-même nomme une vaste Commission chargée de déterminer les moyens prophylactiques à adopter dans toute la

France. Le rapport de cette Commission gouvernementale constitue un volume très documenté et des plus intéressants.

La même année le Conseil municipal de Paris fait afficher dans toutes les rues des avis défendant de cracher sur le sol.

En 1900 une circulaire du Ministre de la Guerre ordonne la coaltarisation des planches de tous les casernements, afin de les rendre imperméables et de substituer au balayage à sec le nettoyage humide.

Dès 1894 la Cie. des chemins de fer de l'Ouest algérien défend de cracher dans ses voitures.

La Cie. des Chemins de fer du Nord et la Cie. des Wagons-lits font la même défense, et de plus elles suppriment le balayage à sec ; tous les tapis sont battus périodiquement dans des espaces clos et par des moyens mécaniques ; la poussière est brûlée après battage.

La Cie. des Wagons-lits place dans ses voitures des crachoirs renfermant de la sciure de bois, qui est brûlée après chaque voyage.

La Cie. du Nord fait désinfecter une ou deux fois l'an tous les bureaux et les couloirs de ses bâtiments. Les employés reçoivent, le cas échéant, des crachoirs individuels en verre bleu. Une soigneuse sélection est d'ailleurs pratiquée pour le recrutement du personnel ; tous les candidats suspects de tuberculose ou faibles de complexion sont rigoureusement éliminés. Chacun de ses employés est muni d'un carnet de santé, où sont mentionnés régulièrement ses indispositions, ses accidents, son dossier de travail. Ce carnet contient aussi des instructions générales concernant l'hygiène propre à la profession du porteur.

La Cie. a placé partout des crachoirs ; elle remplace au fur et à mesure des besoins, toutes ses étoffes, et ses tapis par des sparteries lavables, lincrusta ou autres.

Une circulaire lancée en janvier 1901, par le Directeur-Général des Douanes françaises, prescrit l'adoption, dans son administration, de la plupart des mesures préconisées par la Commission de la Tuberculose.

En février de la même année, une ordonnance ministérielle règle l'application de mesures semblables dans tous les locaux de l'Administration des Postes.

En fait de Sanatoria populaires proprement dits, il n'y a qu'Angicourt (pour les tuberculeux de Paris), Hauteville (pour ceux de Lyon), l'asile Jean Dollfus à Cannes, le sanatorium girondin, celui de Cimiez, près de Nice, qui soient ouverts.

Plusieurs sociétés ont été fondées en vue de favoriser ou d'entreprendre la création d'asiles de phtisiques à Paris, Amiens, Bordeaux, Le Havre, Le Mans, Marseille, Rouen, Versailles et ailleurs.

On commence également à établir en France des dispensaires gratuits, conformément aux excellentes données exposées par le prof. Calmette dans le compte-rendu des Travaux de la Commission de la tuberculose. Celui qu'il organise en ce moment à Lille, à côté de l'Institut Pasteur, sera un modèle du genre ; M. le Dr. Bonnet en a fondé un à Paris, et on projette d'en créer d'autres à Paris et à Tours, à Laval et ailleurs encore.

La France possède un grand nombre d'hôpitaux marins pour les enfants scrofuleux et tuberculeux. Il en existe 14 à l'heure actuelle, créés par diverses œuvres: Œuvre des hôpitaux marins (Banyuls et St Rrojan), le sanatorium d'Arcachon, celui de St. Pol-sur-Mer, de Morlaix, etc.; Berck-sur-Mer et Hendaye appartiennent à l'Assistance publique de Paris.

Enfin il me reste à signaler comme hôpitaux non maritimes d'enfants tuberculeux et scrofuleux, *l'Œuvre de Villepinte* et *l'Œuvre des enfants tuberculeux*. Cette dernière, qui a pris une extension énorme, a commencé tout modestement en 1888 par l'hôpital d'Ormesson, qui comptait à ce moment 12 lits. Petit-à-petit l'œuvre a grandi, et actuellement elle possède deux hôpitaux, Ormesson (130 lits) pour enfants tuberculeux de 3 à 12 ans, et Villiers (220 lits) pour enfants tuberculeux de 12 à 16 ans; deux colonies sanitaires achevées (Noisy-le-grand et Trémilly), où les malades guéris sont exercés aux travaux du jardinage. Plus tard ils sont placés à la campagne, où ils peuvent se créer une situation en rapport avec leur état de santé. Ils restent sous le contrôle médical de l'Œuvre. Les colonies sanitaires de Ménillet et de Rougemont sont en voie de création. Les malades sont présentés et examinés au dispensaire de l'Œuvre, rue Miromesnil, à Paris.

Cette œuvre décrétée d'utilité publique en 1894 a reçu à diverses reprises outre des dons particuliers, de fortes subventions prélevées sur le produit du pari mutuel, et elle a été à deux reprises autorisée à faire une loterie (1,000,000 fr. en 1897 et 4,000,000 fr. en 1899).

Le développement énorme qu'a pris cette œuvre admirable est dû pour la plus grande part au dévouement de ses savants président et secrétaire-général, les Drs. Hérard et Léon Petit, et de leur précieuse auxiliaire sœur Candide (Mme Faurestié).

HOLLANDE.

Il n'existe dans ce pays à proprement parler aucune Ligue contre la tuberculose, mais bien une *Société pour la création et l'exploitation de sanatoria populaires*, ayant des sous-comités dans les villes principales de la Hollande. Le premier établissement construit par cette société, au moyen de fonds souscrits par des particuliers, est le sanatorium de Hellendoorn, pour 54 lits; elle poursuit au moyen de ses sous-comités l'établissement de plusieurs asiles du même genre dans tout le pays, et grâce à la propagande exercée partout, le public s'intéresse de plus en plus à cette question.

Cette année-ci encore s'ouvrira le sanatorium "Orange-Nassau Oord," installé dans une propriété donnée dans ce but par la reine-mère, qui a ajouté à ce don une somme de 300,000 florins.

Enfin la Hollande possède plusieurs hôpitaux marins pour enfants tuberculeux.

HONGRIE.

Sous l'impulsion du professeur Korányi, le gouvernement s'occupe depuis plusieurs années de la tuberculose.

Une circulaire du Ministre de l'Intérieur en Hongrie, datée de janvier 1898, expose longuement et avec beaucoup de clarté aux municipalités du pays les

mesures à prendre pour limiter l'extension des ravages de la tuberculose; notamment en ce qui concerne l'hygiène des habitations, l'isolement des tuberculeux dans les hôpitaux, le placement de crachoirs dans les lieux publics, la défense de cracher à terre, etc. En même temps le ministre faisait envoyer à ces municipalités de nombreux exemplaires d'une brochure à distribuer au public, contenant d'excellentes instructions sur les moyens de se préserver de la phtisie. De plus il manifesta l'intention de nommer un inspecteur sanitaire pour la tuberculose uniquement.

Les autres ministres du gouvernement hongrois ont pris, dans leur ressort respectif, les mêmes dispositions que leur collègue de l'Intérieur, qui les y avait invités d'ailleurs.

La question des sanatoria populaires a également reçu une solution à la suite des efforts du professeur Korányi : *l'Œuvre du sanatorium de Budapest* a vu récemment s'ouvrir le sanatorium Elisabeth. La ville de Budapest a l'intention d'en construire un également. Le gouvernement encourage d'ailleurs fortement la création d'asiles pour tuberculeux : la loi XXI de 1898 institue une *Caisse nationale de secours aux malades de la Hongrie*, destinée à aider dans cette voie les provinces et les municipalités dont les ressources sont insuffisantes. Cette caisse, alimentée par un impôt additionnel de 3 % sur l'impôt direct, dispose d'un revenu annuel d'environ quatre millions de couronnes.

ITALIE.

Une Ligue nationale contre la tuberculose a été fondée par les profess. Baccelli et De Giovanni il y a deux ans.

Elle a des comités au nombre de 60 environ, dans les villes les plus importantes de l'Italie; des délégués de ces comités constituent le comité général qui siège à Rome. Elle s'occupe de la propagande générale, et encourage la création de Sanatoria populaires, dont il n'en existe encore aucun achevé jusqu'à présent.

Il y en a deux en construction, un à Vercelli et un à Naples, dans la villa donnée par la duchesse Ravaschieri. Deux asiles seront commencés bientôt, à Rome et à Padoue; enfin plusieurs autres sont en projet; ils porteront le nom d'Humbert 1er et seront placés sous le protectorat de la reine Marguerite.

On sait que l'Italie compte divers hôpitaux maritimes pour les enfants scrofuleux et rachitiques.

Le gouvernement de son côté n'est pas resté inactif; il a édicté diverses mesures contre la propagation de la phtisie. Je vais en énumérer brièvement les plus intéressantes.

En 1897 une circulaire ministérielle prescrivait l'isolement des tuberculeux des hôpitaux dans des pavillons spéciaux.

En 1899 une nouvelle circulaire à tous les préfets du royaume rappelle les termes de la précédente, et en étend les dispositions à tous les établissements hospitaliers quelconques, en même temps qu'elle prescrit de veiller à l'adoption de mesures hygiéniques dans tous les locaux de travail quels qu'ils soient.

En 1900 le gouvernement ouvre un concours entre ingénieurs pour un projet de Sanatorium.

En février 1901, publication d'un règlement sanitaire général, contenant les articles suivants relatifs à la tuberculose :—

"Les médecins sont tenus de déclarer les cas de cette maladie qui se produisent : dans les hospices, les orphelinats, les prisons, les hôtels, les écoles, les couvents, les maisons de santé, dans les laiteries et les vacheries ; enfin dans quelque lieu que ce soit, en cas de décès ou de changement de domicile.

"Dans ce cas la désinfection des effets, des literies et de l'habitation des malades est obligatoire.

"Il est défendu de prendre en traitement des malades tuberculeux dans un des établissements énumérés ci-dessus, quand on ne dispose pas de locaux avec service séparé.

"Il sera défendu de cracher à terre, et on placera des crachoirs dans toutes les habitations collectives, dans les écoles, dans les bureaux, les lieux publics, les ateliers, etc.

"La surveillance des laiteries est très sévère pour empêcher la vente de lait contaminé.

"En plus de toutes ces mesures, on emploiera contre la tuberculose les moyens préconisés contre les maladies infectieuses en général, et notamment : la faculté accordée aux communes d'imposer au moins une fois par an un nettoyage complet, éventuellement précédé de désinfection, des maisons de logement, pensions, etc., le nettoyage et la désinfection obligatoire une fois l'an au moins, des hôpitaux et tous les établissements hospitaliers ou de convalescence, publics ou privés ; la défense de vendre ou de tenir pour les vendre, les vêtements et objets, les literies non désinfectés et nettoyés ; l'obligation de désinfecter au moins une fois l'an les écoles, les prisons, asiles et établissements d'instruction et d'éducation en général, et d'en éloigner immédiatement les personnes atteintes d'affections transmissibles."

PRINCIPAUTÉ DE MONACO.

Le nouvel hôpital en construction à Monaco comprendra un pavillon séparé aménagé dans toutes les règles de l'art, pour le traitement des tuberculeux pauvres.

NORWÈGE.

Le Gouvernement norwégien n'a pas craint de recourir aux moyens les plus énergiques ; le 1er janvier 1901 est entrée en vigueur une loi sur la prophylaxie de la tuberculose, dont je tiens à reproduire ici les dispositions essentielles :—

"Tous les cas de tuberculose doivent être signalés par les médecins traitants au président de la commission de salubrité chaque fois que la nature des *excreta* du malade constitue une source de dissémination de la maladie.

Les médecins sont également tenus de déclarer les cas de décès par tuberculose ; à défaut de médecin traitant, ce devoir incombe à la personne chargée de la déclaration du décès.

"Le cas échéant, par décision de l'administration communale approuvée par le Roi, on peut exiger une déclaration analogue en cas de changement de domicile du malade.

"Le médecin traitant prescrira les mesures d'hygiène et les précautions capables d'empêcher la propagation de la maladie, et veillera à leur exécution. S'il est dans l'impossibilité de les faire observer, il en informera le président de la commission. Dans ces cas, de même que lorsqu'il n'y a pas de médecin traitant, le président de la commission ou un autre médecin agréé par lui prend la surveillance du cas au point de vue de l'hygiène et dans la mesure indiquée par les circonstances.

"Si le président juge le cas particulièrement dangereux, il le soumet à la commission de salubrité, qui prend des mesures en conséquence et peut même ordonner le transfert du malade dans un hôpital. Il est cependant défendu de séparer deux époux lorsqu'ils demandent à rester ensemble.

"Le logement occupé précédemment par un tuberculeux (soit après décès, soit après changement de domicile) ne peut pas être occupé, et les vêtements, le linge, et la literie ayant appartenu au malade ne peuvent pas être utilisés par d'autres personnes, avant d'avoir été soumis à une désinfection complète.

"Il est défendu à la Bienfaisance de charger, sans autorisation de la commission sanitaire, des tuberculeux de donner des soins à des personnes non atteintes de tuberculose ; il est également interdit de charger sans autorisation un indigent de soigner une personne tuberculeuse.

"Lorsqu'il est impossible d'éviter d'une autre façon les chances de contagion, la commission peut interdire à des personnes atteintes de tuberculose de participer à la préparation ou à la vente de substances alimentaires.

"La commission peut également défendre à des femmes et à des jeunes filles tuberculeuses de s'engager comme nourrices ou bonnes d'enfants ; elle peut empêcher la vente de lait provenant d'étables où les personnes atteintes de ce mal sont chargées de soigner les vaches ou de manipuler le lait.

"Le roi ou son délégué peut, après avis conforme de la Commission sanitaire, ordonner des mesures générales pour empêcher le développement de la tuberculose dans les ateliers, fabriques, magasins, hôtels, hospices, maisons de logement, écoles, églises, théâtres, palais de justice, salles de concert ou de danse, prisons, asiles d'aliénés, casernes, wagons de chemins de fer, etc.

"Les frais de déplacement, de désinfection, et autres résultant de l'application de la présente loi, sont à charge de l'État, des provinces, ou des communes, selon les circonstances.

"Les prescriptions en vue d'assurer l'application de cette loi sont édictées en partie par le roi ou son délégué, et par les autorités médicales officielles.

"Les infractions à la présente loi sont passibles d'une amende de 2 couronnes (2·80 frs.)."

Cette loi a été préparée, sur l'ordre du département de la Justice en

Norwège, par MM. les Drs. Holmboë, médecin-directeur, et Klaus Nanssen, médecin en chef de l'hôpital de Bergen.

En outre, dès 1899, l'Assemblée des médecins de Norwège avait distribué des instructions destinées à être remises à tous les malades par le médecin traitant. Des brochures populaires sur la tuberculose sont distribuées en grand nombre au public.

Il existe plusieurs sanatoria populaires en Norwège : le premier s'est ouvert en 1897 à Reknaes, près de Molde. Les frais sont payés en partie par l'État et en partie par les municipalités et par les malades eux-mêmes. Un second établissement semblable est sur le point de s'ouvrir à Lyster, près du Sognefjord ; il est construit au moyen des fonds destinés jusqu'ici à combattre la lèpre devenus disponibles par suite de la constante diminution des cas de cette affection. L'État projette la création d'un troisième sanatorium, qui sera probablement placé près de Byglandsfjord, dans la partie méridionale de la Norwège, la plus éprouvée par la tuberculose.

En différents points du royaume on a formé des comités, dans le but d'étudier la création d'asiles analogues et d'hôpitaux spéciaux pour les indigents tuberculeux. L'Association sanitaire des femmes de Norwège participe avec zèle à ces études.

Enfin il existe encore en Norwège des hôpitaux marins subsidiés par l'État pour le traitement des enfants tuberculeux, scrofuleux, etc.

PORTUGAL.

Une *Ligue nationale d'assistance aux tuberculeux* existe en Portugal depuis 1899. Elle reçoit du Roi une dotation annuelle de 100,000 ps. et du gouvernement une autre de 150,000 ps. Des dons privés ont produit une somme totale de 600,000 ps. Ces ressources ont permis la création d'un sanatorium populaire à Ontão ; un second ainsi qu'un dispensaire sont à l'étude.

De nombreux ouvrages de propagande sont distribués gratuitement.

Une seconde œuvre, *la Ligue portugaise contre la Tuberculose*, dont le secrétaire-général est le Dr. de Azevedo, a été fondée en 1899. Elle a surtout pour but la propagande antituberculeuse. Elle a dans chaque ville importante un comité local autonome. Son programme ne comporte pas la création de Sanatoria.

ROUMANIE.

L'attention du gouvernement et du public commence à se porter sur la nécessité de mettre un terme au dommage causé au pays par la tuberculose. Il existe des règlements très précis sur l'hygiène des habitations, les égoûts, l'hygiène alimentaire, etc. ; la désinfection des habitations en cas de tuberculose est également prescrite, mais on se plaint que toutes les mesures ne soient pas observées.

En 1898 le Conseil d'hygiène publique de la ville de Bucharest a publié

des instructions populaires contre la tuberculose. De sérieux efforts sont faits, pour arriver à créer une Ligue nationale contre la tuberculose, et ces efforts ne tarderont pas à aboutir.

L'Ephorie a acquis un terrain dans le district de Gory, pour y construire un sanatorium. Il existe déjà quelques établissements maritimes pour le traitement des enfants scrofuleux ; le plus important est celui de Tekir-Ghiol.

RUSSIE.

En Russie la croisade antituberculeuse prend de sérieuses proportions. Une commission spéciale placée sous la présidence du prof. Schervinsky, et dont fait partie notamment M. le Dr. Blumenthal, le savant directeur du laboratoire de bactériologie de Moscou, un des plus zelés propagandistes de la lutte contre la phtisie, a été nommée au sein de *la Société des médecins russes Pirogoff* (à Moscou) en vue d'étudier les meilleurs moyens de combattre la tuberculose dans tout l'Empire. Cette commission poursuit ses travaux depuis deux ans, et doit présenter son rapport au prochain congrès Pirogoff, qui aura lieu à Moscou en janvier 1902. Les points principaux, qui seront examinés dans ce rapport, portent sur (1°) l'assurance obligatoire des travailleurs; (2°) la transformation de la commission Pirogoff en un Comité central pour toute la Russie.

A St. Pétersbourg la *Société des médecins des hôpitaux* a constitué, sur la proposition du Dr. Rubel, une commission pour combattre la phtisie dans la capitale. Un Comité ayant le même but existe à Kiew sous la présidence du Prof. Tritschel ; à Varsovie le Prof. Dunin, président de la Société d'hygiène, a fait une active propagande, au moyen de tracts et de brochures populaires, à la suite de laquelle la société a décidé la création d'une Ligue contre la tuberculose, placée sous la présidence du Prof. Baranowski.

Le mouvement russe ne se borne pas à éveiller l'attention du public sur les dangers et la prophylaxie de la phtisie ; il provoque également la création de nombreux sanatoria populaires.

Le gouvernement russe n'est pas intervenu officiellement jusqu'ici ; il n'a édicté aucune mesure législative contre la propagation du mal. Mais S.M. l'Empereur a, par sa munificence personnelle, contribué, il y a plusieurs années déjà, à l'installation du grand établissement d'Halila en Finlande ; dans la suite il a fait don à *la Société des médecins russes de St. Pétersbourg* du superbe domaine de Taïtzi, et d'une somme de un million et demi de francs pour en achever la transformation en sanatorium. Enfin la générosité de l'Empereur a permis la construction d'un autre sanatorium à Yalta, près de Livadia en Crimée. Dans la même localité, grâce aux efforts de la princesse Barjatinska, on a fondé à côté de l'école des garçons un pensionnat spécial pour enfants scrofuleux ou suspects de tuberculose.

A Varsovie, le Prof. Dunin est parvenu à recueillir près de 100,000 roubles pour un asile populaire de 60 malades à ériger dans les environs de la ville.

A Kiew, la municipalité a fait don d'un terrain et d'une subvention annuelle dans un but analogue.

A Moscou doit avoir lieu cet été même la pose de la première pierre d'un vaste établissement pour 500 malades, construit par la municipalité, au moyen de ses propres fonds et d'une importante donation de la famille Rachmanoff (200,000 roubles); l'administration du Gouvernement de Moscou (Zemstwo) a reçu de MM. Chrapunoff et Kusnezoff une somme d'environ 150,000 roubles pour la création d'un sanatorium populaire dans le district de Bronniza.

Il existe encore un asile de tuberculeux à Pitkäjärvi (pour israélites). Dans la ville industrielle de Lodz on a installé à l'hôpital Poznawski un service séparé pour les phtisiques.

A l'hôpital militaire Tsarkoé-Selo, le Dr. Unterberger a transformé quelques salles, les mieux exposées, en "sanatorium domestique," où les tuberculeux sont soumis au même traitement rigoureux que dans les sanatoria modèles.

Le Congrès russe de Balnéologie, en 1900, a reconnu la nécessité de construire dans tout l'Empire des sanatoria populaires en nombre proportionnel à la population, et sur toutes les côtes de Russie, des hospices maritimes pour les enfants atteints de tuberculoses locales.

Enfin dans le Caucase un grand sanatorium sera bientôt créé aux frais d'une haute personnalité, le Duc d'Oldenbourg (fondateur du célèbre Institut de médicine expérimentale à St. Pétersbourg). Une commission composée de médecins et de bactériologistes éminents de la capitale, s'occupe de rechercher un emplacement favorable.

SUÈDE.

En 1896 la Société des Médecins suédois mit résolument à l'étude la question de la tuberculose et des moyens propres à la combattre. Elle émit plusieurs vœux en faveur de l'adoption de mesures prophylactiques et de la création de sanatoria.

À l'occasion du jubilé de la vingt-cinquième année de règne du roi Oscar II., une souscription nationale fut ouverte en 1897, qui rapporta 2,300,000 couronnes (soit 3,220,000 frs.). Le roi décida de consacrer cette somme à la construction de trois sanatoria de 100 lits chacun (50 pour hommes et 50 pour femmes) l'un dans le Nord, l'autre dans la partie moyenne, et le troisième dans le sud de la Suède.

Une commission spéciale fut chargée par le roi, de l'exécution de ce projet.

Le sanatorium du centre de la Suède sera achevé cette année; les deux autres en 1902.

Le Reichstag (la Chambre) suédois vota une somme de 850,000 couronnes (1,190,000 frs.) à ajouter au fonds du jubilé, et fit don d'immenses terrains pour chacun des trois sanatoria, ainsi que d'une énorme quantité de bois de construction.

Le fonds du jubilé permet donc d'affecter à chacun des trois établissements, outre les frais de construction, un capital de 600,000 couronnes (840,000 frs.) dont les intérêts serviront à couvrir en majeure partie les frais d'entretien des malades.

La ville de Stockholm a décidé de son côté, de construire un asile de 100 lits pour ses tuberculeux; elle a ajouté à l'un de ses hôpitaux un pavillon séparé pour cette catégorie de malades.

La scierie à vapeur de Kramfors a l'intention d'établir un sanatorium pour ses ouvriers tuberculeux.

SUISSE.

La population entière, peut-on dire, de la Suisse s'intéresse à la lutte contre la tuberculose. Dans la plupart des villes importantes, il existe des comités pour venir en aide aux tuberculeux pauvres, pour répandre de petits ouvrages de propagande dans le public. Ce sont également des comités privés, possédant la personnification civile, qui la plupart du temps entreprennent la création de sanatoria. L'élite de la population s'associe à ces œuvres, ainsi que les gouvernements cantonaux et les communes qui leur accordent d'importants subsides.

Bien que la Suisse ait peu d'étendue, elle compte cependant une dizaine d'asiles populaires, dont deux à Davos, l'un construit pour les habitants de Bâle et des environs, et l'autre bâti par un Comité allemand pour les malades pauvres de cette nationalité.

Il en existe un à Leysin; un autre à Wald (pour le canton de Zurich); un à Heiligenschwendi (pour le canton de Berne); un à Braunwald (canton de Glaris); un sanatorium est en construction dans le canton de Genève, d'autres en projet dans les cantons des Grisons, St. Gall, Soleure, etc.

Il existe également quelques petits établissements gratuits dus à la seule initiative privée, des hospices et des colonies scolaires pour enfants.

Pas de mesures législatives importantes à ma connaissance.

TURQUIE.

En 1895 le Sultan pria la *Société Impériale de Médecine* de Constantinople de mettre à l'étude la question de la tuberculose et des moyens propres à la combattre. La même année le Sultan ordonnait la création d'un hôpital de phtisiques à Constantinople; malheureusement les évènements d'Arménie et de Grèce en empêchèrent la réalisation.

Cependant la société impériale de médecine nomma une commission dont le rapporteur fut M. le Dr. Ritzo; son rapport fut approuvé par la société et ses conclusions servent de base aux mesures que le gouvernement turc s'efforce de prendre: dans les hôpitaux civils et militaires les tuberculeux sont isolés autant que possible. Chaque tuberculeux possède en tout cas un crachoir séparé.

Il est fortement question d'établir des hôpitaux spéciaux et des sanatoria en Turquie.

Dans les prisons et autres maisons de détention il y aura des locaux séparés pour détenus tuberculeux.

La désinfection est obligatoire en cas de maladies contagieuses graves; dans les autres cas elle est recommandée et se fait gratuitement.

Dans les administrations publiques, dans les écoles, etc., le placement de crachoirs est de rigueur, avec défense formelle de cracher à terre.

L'initiative privée seconde efficacement les efforts officiels. Les notions de prophylaxie de la tuberculose gagnent constamment du terrain au sein des masses, et on y regarde, par exemple, à prendre à son service une nourrice, une institutrice, un cuisinier suspects de phtisie. Dans les écoles on donne aux élèves des notions d'hygiène, on leur enseigne l'utilité des crachoirs.

Dans beaucoup de lieux publics, cafés, etc., on a placé des crachoirs et des écriteaux défendant de cracher.

PAYS D'AMÉRIQUE.

BRÉSIL.

Il existe au Brésil plusieurs œuvres antituberculeuses : la plus ancienne est celle qu'a fondée en 1899 M. le Dr. Clemente Ferreira à St. Paul, et qui a pour but la création d'un asile populaire pour les phtisiques.

La seconde est *la Ligue brésilienne contre la tuberculose*, fondée en août 1900 par les Drs. Cypriano de Freitas et Hilario de Gouveia, professeurs à l'université de Rio de Janeiro. La Ligue est placée sous la présidence d'honneur du Président de la république et de l'archevêque de Rio de Janeiro. Le Président effectif est le Dr. Vicomte de Ibituruna, le Secrétaire-général est le Dr. Azevedo, Lima.

Elle a commencé par étudier la création d'un sanatorium dans la Sierra di Mantiqueira (État de Minas Geraes).

La Ligue brésilienne fait une active propagande dans le public, au moyen de conférences, d'articles de journaux, de brochures, etc. Elle a obtenu notamment de la municipalité qu'elle défende l'exposition aux étalages des magasins, de substances alimentaires sans que celles-ci soient préservées par des dispositifs appropriés, du contact de la poussière, des insectes, etc.

Les membres de la société, au nombre de plus de 3,000, portent comme signe distinctif un bouton d'émail orné au milieu d'une croix de Malte, et portant au revers : Ligue brésilienne contre la tuberculose.

La Ligue a placé en divers points de la ville et dans des maisons de commerce, jardins publics, théâtres, cafés, etc., des boîtes destinées à recueillir l'obole du public.

Le fonds social atteignait au bout des neuf premiers mois d'existence de la Ligue près de 80,000 frs.

Je signalerai ici, à titre de curiosité, que les compagnies de tramways de la capitale brésilienne contribuent à fournir des ressources à la Ligue, de la manière suivante : elles rachètent moyennant 1 real (1/7me de centime environ) pièce les billets remis aux voyageurs en échange du prix de leur voyage ; ceux-ci déposent ces billets dans des troncs spéciaux, ce qui permet aux compagnies de faire elles-mêmes le contrôle, et les dispense de payer des contrôleurs attitrés. Les sommes affectées au rachat des billets sont versées par elles à la Ligue brésilienne contre la tuberculose.

Outre les deux œuvres que je viens de citer, il existe au Brésil, dans l'État de Minas Geraes, à Juiz de Fora, une autre Ligue, fondée par le Dr. Eduardo de Menazos, mais qui est encore à ses débuts.

CANADA.

A Toronto et à Montréal il existe une *Canadian Association for the prevention and treatment of consumption and other forms of tuberculosis*, affiliée à l'Association nationale anglaise contre la tuberculose, qui a son siège dans la mère-patrie.

A Montréal le Dr. Persillier-Lachapelle est président *d'une Association canadienne pour la santé publique*, qui s'est affiliée il y a trois ans à la Ligue française contre la tuberculose.

En 1894 déjà le gouvernement de Québec a concédé au Dr. Laviolette un terrain de 14,750 acres pour y construire un sanatorium au compte d'une société qu'il représentait. *La Toronto-Association* construit un sanatorium pour lequel elle a obtenu du gouvernement de la province d'Ontario un subside de 100,000 frs., plus 38 frs. par malade et par semaine.

CHILI.

Au Chili une propagande active est faite en vue de provoquer la création de sanatoria, mais je n'ai pas de détails sur l'état actuel de la question.

ÉTATS-UNIS.

Aux États-Unis, les mesures en vigueur varient d'un État à l'autre, voire même d'une ville à l'autre. Il y a des États où l'on ne fait rien, d'autres où les règlements contre la propagation de la tuberculose sont très sévères.

Il en est ainsi par exemple de la ville de New-York, qui a pris la tête du mouvement dès 1893 en appliquant tout un système de mesures préventives conformément aux idées du Dr. Hermann Biggs. De nombreux exemplaires de circulaires contenant des instructions sur la phtisie et sa prophylaxie sont fréquemment distribuées au public depuis plusieurs années déjà.

Des circulaires semblables sont également envoyées aux médecins, avec prière de veiller à leur exécution. Toute personne ayant connaissance d'un cas de phtisie pulmonaire est priée d'envoyer au service de santé le nom du malade, son âge, son sexe, et son domicile, et cela dans les sept jours qui suivent celui où ils en ont eu connaissance.

La notification des cas constatés dans la clientèle privée est facultative. Mais elle est obligatoire pour ceux qui surviennent dans les hôpitaux, asiles, dispensaires, écoles, prisons, fabriques, etc. (Circulaires de 1893 et 1894, promulguées à la suite des rapports du Dr. H. Biggs.)

Les médecins inspecteurs ont pour devoir de s'informer au sujet des cas de tuberculose signalés, de recueillir les crachats ou de les faire recueillir par le médecin traitant, pour les soumettre à l'analyse. A cet effet les médecins

reçoivent gratuitement des récipients en verre fermés à l'émeri et renfermés dans des boîtes en bois sur lesquelles se trouve l'adresse du service de santé de la ville de New-York. Chaque boîte est accompagnée de deux bulletins dont l'un destiné au médecin porte des instructions pour recueillir les crachats; l'autre doit être rempli et renvoyé avec la boîte. D'après le résultat de l'analyse on décide si, oui ou non, il faut recourir à des mesures sanitaires. Si l'on ne découvre pas de bacilles tuberculeux, on envoie au médecin un troisième bulletin disant que, si plus tard on avait des doutes, il faudrait envoyer de nouveau des crachats, car il se peut que les bacilles disparaissent momentanément.

Découvre-t-on des bacilles, on envoie un quatrième modèle de bulletin, annonçant le résultat de l'analyse au médecin, et lui disant qu'il peut à volonté instituer lui-même les mesures prophylactiques convenables, ou bien les faire prendre par un médecin inspecteur du service de santé, qui instruira la famille de l'intéressé.

Les médecins inspecteurs doivent notifier au service de santé les habitations où un tuberculeux est mort, ou seulement a demeuré, afin de les faire désinfecter. Dans ces cas l'administration envoie au propriétaire de l'immeuble l'ordre de désinfecter l'appartement et de le remettre à neuf avant de le relouer. On colle sur la porte un avis disant qu'un tuberculeux y a habité, et qu'on ne peut pas l'occuper avant qu'il ait été désinfecté.

La déclaration obligatoire est adoptée aussi par les États de Philadelphie, Michigan, et Buffalo.

Il est défendu de cracher dans les trams et omnibus de New-York sous peine d'une amende de 500 dollars ou d'un emprisonnement d'un an, ou les deux à la fois. Plusieurs personnes ont été condamnées à ces peines. Il est défendu, dans la plupart des grandes villes des États-Unis, de cracher dans les wagons de chemins de fer, sur le pont, ou dans les cabines des bateaux. Des agents spéciaux, sans aucun signe extérieur distinctif, sont chargés de relever les infractions et de punir les contrevenants.

Une mesure extrêmement sévère vient d'être prise par le Ministre des Finances et la Commission de l'émigration. "La tuberculose est considérée comme maladie contagieuse, et les étrangers qui en sont atteints ne sont pas autorisés à débarquer en Amérique."

En fait de Ligues antituberculeuses, la première fut "*Pennsylvania Society for the prevention of tuberculosis*," fondée en 1892 par son président le Dr. Lawrence Flick; des centaines de mille tracts de propagande ont été distribués gratuitement au public dans les États-Unis. D'autres sociétés ayant le même but existent dans les États de New-York, d'Illinois, et de Maine.

Il n'existe jusqu'à présent qu'un seul sanatorium appartenant au gouvernement des États-Unis; c'est le *Fort Stanton Sanatorium* (New-Mexico), destiné au traitement des marins tuberculeux.

L'État de Massachusetts possède un asile de phtisiques à Rutland; l'État de New-York vient d'acquérir un terrain à Raybrook (Essex County) dans le but d'y construire un sanatorium. Les États d'Illinois, Californie, Maine, Michigan, New-Jersey, Ohio, Connecticut, Rhode Island, sont décidés

à suivre la même voie. L'État d'Alabama a créé une colonie pour les prisonniers tuberculeux (convict-camp).

La ville de New-York consacre chaque année une somme de 700,000 dollars au traitement de ses tuberculeux pauvres dans un sanatorium (Spuyten Duyvil Hospital, sur le Hudson).

Dans l'État de Pennsylvanie il y a, pour les indigents, un *Free Hospital for Consumptives*, fondé en 1895. Dans l'État de New-York il existe encore plusieurs sanatoria payants, dont quelques-uns acceptent des malades à prix très modérés, tels que *l'Adirondack Cottage Sanitarium* du Dr. Trudeau, le *Bowditch Sanitarium*, à Sharon, *le Sanitarium Gabriels* (dans les Adirondacks) et le *Loomis Sanitarium*.

Il y a aussi des hôpitaux pour tuberculeux pauvres dans l'Illinois, le Maryland, et Ohio. Enfin à Denver, dans le Colorado, le *National Jewish hospital for consumptives* (pour israélites) soutenu par la philanthropie privée, soigne les cas favorables de phtisie.

Je termineral cet aperçu en citant deux chiffres qui démontrent l'heureuse influence des mesures antituberculeuses prises à New-York sur la mortalité par phtisie. Cette mortalité était en 1886 de 4·4 par 1,000 hab., en 1889 de 3·9 par 1,000, en 1896 de 3·06 p. 1,000, et en 1900 de 2·23 p. 1,000.

Mexique.

Le Mexique contient des plateaux élevés, excessivement salubres, où le traitement des tuberculeux dans des établissements fermés serait des plus efficaces

Le Conseil supérieur de santé de Mexico est décidé à préconiser une série de mesures prophylactiques contre la tuberculose, ainsi que la création de sanatoria.

République Argentine.

Une Ligue contre la tuberculose y a été organisée par le Dr. Samuel Gache ; elle a un but analogue à celui de toutes les œuvres similaires des autres pays : faire une propagande active dans le public et auprès des autorités au moyen de conférences, de publications, etc. ; préconiser la création d'hôpitaux spéciaux pour les phtisiques dans toutes les grandes villes ; faire surveiller l'hygiène des ateliers et autres locaux où se réunissent beaucoup de personnes ; réclamer la désinfection des voitures publiques, de tramways, de chemins de fer, etc.

Les premiers fonds que recueillera la Ligue serviront à la construction d'un asile maritime pour les enfants à Mardel Plata.

ASIE.

Japon.

Le gouvernement impérial a créé pour le bactériologiste Kitasato un vaste hôpital pour l'étude de la phtisie pulmonaire et pour le traitement des tuberculeux.

AUSTRALIE.

En Australie il y a des comités affiliés à la British National Association, à Brisbane et à Sydney. Le service d'hygiène de cette dernière ville a répandu à un grand nombre d'exemplaires, une affiche au public montrant la mortalité comparée par phtisie, fièvre typhoïde, diphtérie et scarlatine, donnant des indications sur les divers modes de propagation de la tuberculose et sur les moyens de l'éviter; enfin donnant des conseils aux tuberculeux sur l'hygiène des habitations, la désinfection et les précautions à prendre pour ne pas contaminer leur entourage. Il est défendu sous peine d'une amende de 25 frs. de cracher à terre dans la rue ou dans les bâtiments publics. Dans la ville de Sydney également on a recueilli une somme de 500,000 frs. pour la création d'un sanatorium. Il en existe déjà deux à Dalby et à Roma; dans le Queensland il y en a deux, et le gouverneur de la colonie a affecté une somme de 125,000 frs. à la construction d'un troisième.

Dans la Nouvelle Zélande il existe également une Ligue contre la tuberculose, et plusieurs sanatoria sont en voie de construction.

COMMENT LES DIFFÉRENTES NATIONS SE DÉFENDENT CONTRE LA TUBERCULOSE.

COMMENT ELLES DEVRAIENT SE DÉFENDRE. ENTENTE INTERNATIONALE.

PAR M. LE DR. SAMUEL BERNHEIM, *de Paris.*

"MIEUX vaut prévenir que guérir," dit un proverbe français.

Mieux vaut assurément, quand on le peut, prévenir et guérir à la fois: tel doit être le double rôle de l'hygiéniste et du médecin.

Prévenir concerne plutôt l'hygiéniste et le législateur. Mettre en œuvre les moyens propres à conjurer les maladies qu'on à reconnues "évitables," c'est encore faire œuvre médicale puisque la prophylaxie des maladies est l'un des plus importants problèmes de l'hygiène.

Guérir est l'œuvre du thérapeute et du praticien.

La prophylaxie a surtout pour objet de protéger les gens bien portants.

Or si l'on s'est beaucoup occupé depuis 20 ans de la guérison de la phtisie, il est à côté de la thérapeutique antituberculeuse une question qu'on a vraiment par trop négligée: c'est celle de la prophylaxie de la maladie.

Il semble qu'on devrait avant tout chercher à éviter ce qui est évitable, et surtout ce qu'on ne peut guérir à coup sûr. Il est des cas où une bonne prophylaxie, bien comprise et rigoureusement appliquée, équivaut à la meilleure des thérapeutiques.

Certes on ne guérit pas à coup sûr la peste, le choléra, la dysenterie, etc. . . . Et pourtant ces maladies semblent avoir retrocédé devant les

progrès de la civilisation. La thérapeutique, cependant, était à peu près désarmée contre elles. Survienne une épidémie de choléra, et il nous faut bien avouer que nous ne serons guère mieux armés pour la cure de la maladie qu'il y a 25 ans, alors qu'on ne connaissait pas encore l'agent causal de l'infection—qu'il y a même un ou plusieurs siècles. Ce n'est donc pas à la thérapeutique proprement dite qu'il faut rapporter le mérite de la disparition ou du moins de l'extrême rareté du choléra, en tant que maladie épidémique.

Mais les découvertes modernes, les conceptions nouvelles inspirées par la connaissance exacte des maladies épidémiques, de leur transmission, de leur propagation, etc. . . . ont fait faire un pas immense à l'hygiène sociale et internationale.

Des précautions ont été prises contre ce qu'on savait désormais évitable. On n'a plus opposé à la peste et à ses épidémies dévastatrices la résignation fataliste qui faisait dire au fabuliste: "Ils ne mouraient pas tous, mais tous étaient frappés."

On s'est ligué contre le mal. L'hygiène n'est pas devenue seulement une préoccupation des individus. Il y a eu une hygiène collective, une hygiène des groupes entre eux, une hygiène des familles, et mieux encore une hygiène des nations, une hygiène internationale.

Des mesures de prophylaxie communes à une même maladie ont été édictées, qui, après entente entre les pouvoirs publics des diverses nations, ont force de lois internationales.

Il y a une police sanitaire internationale, et ainsi la prophylaxie a fait ce que la thérapeutique n'avait pu réaliser. Nous avons donc raison de dire qu'il est des cas où une prophylaxie rigoureuse équivaut à la plus efficace des thérapeutiques.

Une chose, toutefois, est pour surprendre: c'est que la prophylaxie de la tuberculose ait été aussi négligée.

La prophylaxie de la Tuberculose est d'ordre international.

Passe encore lorsqu'on ignorait comment la maladie prenait naissance, évoluait, se propageait, lorsqu'on en ignorait la cause et la nature; mais du jour où la tuberculose a été classée parmi les maladies infectieuses, microbiennes et, de ce fait seul, évitables, n'aurait-on pas dû d'abord mettre en œuvre tous les moyens d'éviter le mal, de l'enrayer, de le tenir dans l'œuf, quitte ensuite, si la chose était insuffisante, à chercher à la guérir.

Or c'est une preuve affligeante de l'indifférence des peuples vis-à-vis des maux qui les déciment et aussi de l'ignorance de leur gouvernement et de leur législateur, vis-à-vis des plus simples notions d'hygiène, que de constater où en est même actuellement, même alors qu'un mouvement d'indignation et de révolte semble avoir secoué le vieux monde de sa torpeur, la question de la prophylaxie anti-tuberculeuse.

Certes les avertissements n'ont pas manqué. Dans tous les pays, les savants, alors, ont élevé la voix pour clamer le danger et pour dire les moyens de l'éviter. . . . Chaque peuple peut faire sa confession. Il ne s'est laissé

devancer dans cette urgente question de vie et de mort par aucune autre. Tous ont opposé la force de l'inertie et de la routine aux progrès envahisseurs du mal. Nous allons avoir, dans un instant, à en faire hélas! l'amère et générale constatation.

S'il est une question, cependant, qui était d'essence universelle et internationale, c'est bien celle-là! S'il est une maladie qui appelait une réglementation sanitaire au même titre que la peste où le choléra, c'est bien celle qu'on a appelée "la peste des temps modernes." Et s'il est une époque où une entente, une coalition générale s'imposait, c'est bien la nôtre.

Il est malheureusement incontestable qu'aujourd'hui plus que jamais, si l'hygiène de certaines maladies évitables n'avait pas été mieux comprise et mieux appliquée qu'autrefois, nous assisterions à des épidémies, à des calamités publiques, à des hécatombes universelles comme le Moyen-Âge n'en vit jamais; et la raison se comprend très simplement.

Autrefois, une épidémie arrivait à mourir d'elle-même, à s'éteindre sur le lieu même où elle avait pris naissance, parce que le foyer en restait circonscrit et n'avait que peu de tendance à s'étendre. La peste dévastait un pays, une province, une ville: le combat cessait faute de combattants, c'est-à-dire que le fléau, après avoir abattu tous ceux qui étaient destinés à être ses faciles victimes, était étouffé sur place. C'était un mal local.

Il n'en serait plus de même aujourd'hui · qu'on ne s'y trompe pas.

Actuellement, les relations entre provinces voisines, entre nations proches et éloignées, sont devenues si actives, les trafics si nombreux, les contacts si permanents qu'on frémit en pensant ce que serait devenu le monde si, toutes les branches de l'industrie, du commerce, faisant les progrès qu'elles ont faits, la science de l'hygiène était restée stationnaire; si avec la vie actuelle et l'intensité de ses transactions, la multiplicité de ses contacts, on avait encore sur l'hygiène les notions rudimentaires qu'avaient les contemporains des invasions des barbares ou des Croisades. C'est-à-dire, que l'Europe tout entière eût vite été transformée en un foyer d'infections variées, toutes plus meurtrières les unes que les autres.

Grâce aux progrès de l'hygiène, grâce à ces mesures sanitaires acceptées et appliquées en commun par les diverses nations, on est arrivé à endiguer d'aussi épouvantables fléaux.

Tous les jours, on a la preuve manifeste de l'efficacité de ces mesures et de ces lois.

Et l'on n'a pas encore songé, ou du moins l'on n'a rien fait de pareil en faveur de la prophylaxie de la tuberculose!

Mais ne parlons pas encore de prophylaxie internationale. A vrai dire, il n'en est pas question, à tort selon nous, et nous espérons le montrer!

Mais du moins chez elle, chacune de ces nations, qui entre elles se défendent si mal, a-t-elle fait quelque chose sur son territoire pour éviter ce que ses savants lui ont déclaré "évitable"?

Puisqu'elles n'ont jamais songé à se défendre entre elles, ce qui serait de première urgence, du moins comment se défendent-elles individuellement?

Ce n'est pas le procès d'aucun pays, ni d'aucun gouvernement que nous

voulons faire ici, en particulier. A peu de chose près, tous nous semblent également coupables, et également désarmés contre le mal qui les décime. Désarmés, cela va sans dire, parce qu'ils le veulent bien ou parce qu'ils ne veulent pas s'armer.

La défense pratique contre la tuberculose dans les divers pays.

Au surplus, c'est ce qui résultera du rapide examen fait, pour les principales nations, sur la façon dont elles se défendent contre la tuberculose.

En France. Pour ce qui est de la France, la question, on peut le dire, est encore à l'étude. On affiche bien dans les écoles, sur les murs publics, dans les gares, etc., des avis, décisions ou arrêtés pris par le Préfet de Police ou le Ministère de l'intérieur, aux termes desquels il est rappelé qu'il est dangereux de cracher par terre; mais on avouera que ces conseils, qui s'adressent surtout à la simple propreté du public et qui attendent d'elle seule leur exécution, sont lettre morte au point de vue d'une prophylaxie efficace de la tuberculose.

Parlerons-nous des quelques sanatoria, édifiés à grands frais dans ces dernières années, et dont les dépenses d'édification furent telles, celles d'entretien si grandes qu'ils réclament aux malades qu'ils hébergent une rançon accessible seulement aux riches? Il ne fait pas bon en France d'être tuberculeux quand on est pauvre!

Il y a dira-t-on l'Assistance Publique, ses hôpitaux, et son sanatorium (car elle en a un maintenant, aux portes de Paris à Angicourt, et l'on sait ce qu'il lui a coûté!).

Mais l'Assistance Publique ne peut donner asile à tous les tuberculeux de France et de Paris. A Paris seulement ses ressources sont notoirement insuffisantes, et les moyens d'action tout-à-fait défectueux.

La vie du tuberculeux à l'hôpital parisien est vraiment navrante.

Il y entre à peine atteint, souvent curable très probablement; s'il en sort, c'est aggravé; et s'il y rentre une seconde fois, c'est pour n'en plus sortir vivant. Car ici tout concourt à propager la tuberculose. C'est pour elle et non contre elle que l'hôpital fonctionne: Absence de précautions entre les malades, promiscuité des tuberculeux avec les non-tuberculeux, service ridicule des crachoirs, encombrement et insuffisance d'air, alimentation insuffisante, etc.

Tels sont les moindres inconvénients sur lesquels nous avons récemment assez appelé l'attention publique. (S. Bernheim: La défense pratique contre la tuberculose) pour qu'il nous soit permis de ne pas insister. Tout concourt à l'hôpital à propager le fléau, à hâter la fin des tuberculeux, et à contaminer les autres. "Tout plutôt que ce qui est," dit le Docteur Huchard, en parlant de nos hôpitaux parisiens.

Et cependant en France si l'on a peu agi, on a beaucoup parlé et beaucoup écrit.

Des deux grandes commissions extra-parlementaires de la tuberculose, nommées l'une par le Conseil Municipal de Paris, l'autre par le Ministère de

l'Intérieur, cette dernière a récemment publié le résumé de ses travaux. Dire qu'il s'y trouve des rapports remarquables et de judicieux conseils nous paraît superflu.

On ne pouvait que les attendre des hommes éminents qui composent cette commission.

Dans un excellent rapport qui est comme la conclusion des travaux particuliers et des rapports spéciaux des diverses sections de la commission, le Professeur Brouardel précise nettement la question et indique quelques unes des réformes les plus urgentes.

Il est souhaitable que l'on passe enfin de la théorie à la pratique.

Parmi les propositions émises au sein de la "Commission de la Tuberculose," l'une des mieux venues et des plus brillamment soutenues est celle que M. Calmette défend en un excellent rapport, concernant la création de dispensaires pour tuberculeux. Le Docteur Brouardel lui consacre une place importante dans son rapport général :—

"Tous les médecins, dit-il, qui ont cherché à organiser la lutte contre la tuberculose, se sont heurtés aux difficultés suivantes :

"1°. La tuberculose est curable surtout dans ses premières périodes.

"2°. Le nombre des tuberculeux est tel, en France (400,000 ou 500,000) que quelque immense que soit l'effort, il sera toujours partiel et au-dessous des nécessités.

"Malgré ses 43 sanatoriums populaires, l'Allemagne se trouve en présence des mêmes difficultés et actuellement parallèlement avec la création de nouveaux sanatoriums, elle organise dans les villes des policliniques pour tuberculeux.

"Un personnel médical muni de l'outillage nécessaire donne ses soins aux tuberculeux qui viennent le consulter pendant tout le temps de la maladie ou pendant la période qui précède le moment où le malade veut entrer dans un sanatorium et où celui-ci peut lui ouvrir ses portes.

"Un comité de patronage, composé de personnes bienfaisantes, parmi lesquelles les dames sont en grand nombre, suit le malade à domicile, donne des conseils à la femme, veille à la propreté du logis, indique les mesures prophylactiques nécessaires. Elle écarte dans la mesure du possible la misère inséparable du chômage, en puisant dans une caisse de secours de famille, alimentée comme celle des sanatoriums.

"M. Calmette a été frappé par les mêmes considérations, mais, et c'est ce qui fait l'originalité de sa proposition, il demande qu'au lieu d'attendre que l'ouvrier vienne demander l'avis des médecins on aille au devant de lui, on l'invite à venir à un dispensaire, analogue aux policliniques allemandes. . . ."

M. Calmette expose, en effet, que l'œuvre des dispensaires anti-tuberculeux peut seule compléter efficacement le rôle nécessairement si restreint des sanatoriums.

Une expérience de quelques mois dont nous avons relaté ailleurs les résultats, nous autorise à penser que les dispensaires anti-tuberculeux, mis à la portée de tous les malades, et permettant à ceux-ci de se soigner au début

même de leur affection, sans entrer au dangereux hôpital, constituant la partie la plus importante de la défense pratique contre la tuberculose.

L'œuvre des dispensaires, fondée par l'initiative privée et soutenue du concours de généreux donateurs, attirera bientôt l'attention de l'État, qui verra en eux ses meilleurs collaborateurs dans la lutte contre la tuberculose.

La défense se dessine donc en France. Mais elle n'est qu'ébauchée.

Il est juste de dire qu'a une ou deux exceptions, les nations voisines ne se sont jusqu'ici pas mieux défendues.

Nous avons consulté à ce sujet un grand nombre de nos confrères étrangers, Russes, Danois, Roumains, Italiens, Allemands, Anglais, etc. Ils ont bien voulu pour la plupart nous dire qu'elle était l'organisation, chez eux, de la défense contre la tuberculose.

Nous résumerons ici quelques unes de leurs communications. La source où nous avons puisé est donc aussi exacte que possible.

La défense pratique contre la tuberculose au Danemark.

Voici par exemple les renseignements que nous trouvons dans la réponse qu'a bien voulu nous faire notre confrère, le Dr. Saugman, directeur du sanatorium de Vejlefjord, touchant les mesures prises au Danemark contre la tuberculose :

1°. Contre la tuberculose du bétail.

L'État donne tous les ans 1,006,000 couronnes, soit 138,000 francs, pour l'examen du jeune bétail par la tuberculine. La lutte est organisée avec beaucoup de zèle par le professeur Bang, de Copenhague.

2°. Contre la tuberculose humaine.

Désinfections gratuites après le décès des tuberculeux.

Depuis 1875, fonctionne l'hôpital marin de Refsucïes pour des enfants tuberculeux. Cet hôpital contient 130 lits.

On construit actuellement le sanatorium marin de Juetsuicuide pour 70 enfants tuberculeux.

Le Danemark compte plusieurs sanatoria pour phtisiques.

Le sanatorium de Vejlefjord, que dirige avec sa science le Dr. Saugman. Ce sanatorium a été établi avec une subvention de l'État, de 138,000 francs. Il compte 93 lits.

Le sanatorium populaire de la ville de Copenhague à Boseruji pour 120 lits, sera ouvert le 1er novembre prochain.

En outre, une ligue contre la tuberculose est formée depuis janvier dernier ; elle a déjà 8,000 adhérents, sous la présidence du Dr. R. Deuburg, de Copenhague. On espère pouvoir dans quelques années, bâtir des sanatoria populaires dans diverses provinces.

Ce sont là assurément de très louables efforts. Ils semblent avoir déjà porté leurs fruits. La lutte est organisée avec raison non seulement contre la tuberculose humaine, la campagne menée en faveur du tuberculeux. Mais la prophylaxie reçoit un appui efficace de la lutte que les pouvoirs publics danois entreprennent contre la tuberculose et bovidés.

Nous avons dit qu'au Danemark, le professeur Bang a le premier vulgarisé l'emploi de la tuberculine; or au mois de mai 1897 avaient été soumises à l'épreuve de la tuberculose 5,723 étables avec 158,999 bêtes. Il en résulte que 22 per cent. seulement étaient exemptes de tuberculose. Ont réagi 49,000 bêtes, c'est-à-dire 31 per cent. des animaux soumis à l'épreuve. D'après les dernières communications de Bang, le nombre des animaux qui ne réagissent pas à l'inoculation a notablement augmenté depuis lors. Un exemple très instructif est celui de Bang, qui a opéré lui-même à Thurbey, dans le Danemark; au commencement de l'emploi de la tuberculine, 9 pour cent, 9·7 pour cent de bêtes réagissaient; dans les dernières années, la proportion est descendue entre 0·8 et 4·7 pour cent; ce qui est un progrès très grand.

Suède.—Sur ce qui s'est fait en Suède, notre confrère le Dr. Carl Janson veut bien nous renseigner en ces termes:

"Je regrette," nous écrit-il à la date du 4 juin dernier, "d'avoir à vous dire qu'il n'a été encore fait que peu de chose pour combattre la tuberculose dans notre pays. Ce qui a été fait est de date récente.

"En 1897, à l'occasion du 25e anniversaire de son règne, notre Roi décida qu'une somme de 22,000,000 couronnes qui avait été réunie par souscription, serait affectée à la construction de sanatoria pour poitrinaires.

"Deux de ces établissements, Halahult dans le centre et Osteros dans le Nord, ont déjà été construits. Ils reçoivent chacun 100 malades, qui sont censés y faire un séjour moyen de 3 mois chacun au prix de 50 ore, 1 cour. 25, 2 cour. 50, et 3 cour. 50 par jour, selon les ressources pécuniaires et les prétentions du patient.

"Un autre sanatorium de la même grandeur que le précédent pour lequel le 'Ricksdag' a déjà voté les fonds nécessaires, et qui sera destiné à la Suède méridionale, est en construction dans la province de Sulaland.

"La ville de Stockholm a fait construire à l'hôpital de Saint Gorau, un pavillon spécial pouvant recevoir cent malades tuberculeux.

"Je crois qu'en ajoutant que la Société anonyme de Separator de Stockholm a fait construire un sanatorium (recevant environ 30 patients) pour ceux de ses ouvriers qui sont atteints de tuberculose, j'aurai dit tout ce qui a été fait dans le pays, en ce qui concerne les sanatoria et autres établissements pour tuberculeux.

"En ce qui concerne la médecine vétérinaire, l'État fournit gratuitement la tuberculine aux vétérinaires, ce dont les agriculteurs profitent dans une large mesure.

"Le public est à l'heure actuelle pénétré au plus haut degré de cette opinion que la tuberculose est contagieuse. Aussi met-on avec empressement à profit l'offre faite par le Comité du service sanitaire de la ville de Stockholm de faire désinfecter à ses frais les locaux où sont morts des tuberculeux.

"Un avis affiché dans les corridors des hôpitaux, dans les voitures publiques, les tramways et dans plusieurs monuments publics, invite à ne pas cracher sur le plancher, mais seulement dans les crachoirs.

"En 1899, les décès par tuberculose ont fourni à Stockholm 13·10 pour cent de la totalité des décès et 2·63 pour 1,000 de vivants."

Cette lutte contre la tuberculose n'est, on le voit, guère plus avancée en Suède qu'en France. En additionnant le nombre de lits mis à la disposition des tuberculeux, tant dans les sanatoria que dans les hôpitaux, on touche du doigt, ainsi que la comparaison en a été faite pour la France, tout ce qu'a d'insuffisant la combinaison qui met tout son espoir dans l'édification de sanatoria.

3°. *Roumanie.*—Si nous passons à une nation plus petite, la Roumanie, où cependant l'enseignement médical est très élevé (témoin, l'Institut de Bucarest), écoutons ce que nous dit sur elle notre confrère le Dr. Stéfanesco, de Bucarest, Directeur-Général du Service Sanitaire au Ministère de l'Intérieur.

". . . . J'ai l'honneur, nous écrit-il, de vous faire savoir que malheureusement, en Roumanie, nous n'avons pas encore de mesures de prophylaxie prises et appliquées en réalité contre la tuberculose.

"Il est vrai pourtant que depuis quelque temps, la question de la tuberculose a été beaucoup agitée chez nous, et plusieurs mesures de prophylaxie, comme l'emploi de la tuberculine, l'isolement des tuberculeux dans les hôpitaux, la défense de cracher sur le parquet dans les lieux publics, la publication des instructions populaires pour la préservation de la tuberculose, la désinfection des maisons à louer, etc., sont entrées dans la pratique courante, mais non assez généralisés. Quant aux résultats obtenus c'est une question d'avenir.

"J'ajouterai encore que le mois dernier, un congrès medical s'est réuni à Bucarest, où l'on a décidé la formation d'une ligue contre la tuberculose."

Ce ne sont que des projets; cela rappelle ce qui s'est fait en France, pendant longtemps. Il serait urgent de passer aux actes.

Nous pourrions poursuivre cette enquête pour les diverses contrées de l'Europe. Nous jugeons inutile de rapporter toutes les réponses de nos distingués confrères. C'est ainsi que le Dr. Ritzo de Constantinople, d'autres confrères Italiens, Espagnols, Grecs, Autrichiens, Russes, Portugais, Serbes, Bulgares, déplorent le laisser aller, la négligence des pouvoirs publics, et constatent avec amertume le développment graduel, le progrès de la tuberculose dans leurs pays.

Outre que dans beaucoup d'entre elles, cette enquête ne nous apprendrait rien de nouveau ou de pratique, les chiffres gagnent souvent à être prorogées; de leur rapprochement peuvent surgir des constatations intéressantes.

Statistique de la léthalité tuberculeuse en Europe.—Pour nous éclairer sur l'état actuel de la question de défense pratique contre la tuberculose, sur la façon dont elle est appliquée, et surtout sur les résultats que ces moyens de défense donnent dans les divers pays d'Europe, consultons de récentes statistiques.

Au Congrès de Berlin de 1899, l'Office de Santé a fait distribuer une statisque intéressante; elle ne tient compte que de la phtisie pulmonaire, en laissant de côté toutes les autres manifestations tuberculeuses, et des décès causés par la phtisie.

Voici cette statistique, basée sur un million d'habitants.

Russie . . .	plus de	4,000	morts.
Autriche . . .	„ „	3,000	„
Hongrie . . .	„ „	3,000	„
France . . .	„ „	3,000	„
Suède . . .	„ „	2,000	„
Allemagne . . .	„ „	2,000	„
Suisse . . .	„ „	2,000	„
Irlande . . .	„ „	2,000	„
Pays-bas . . .	„ „	1,000	„
Italie . . .	„ „	1,000	„
Belgique . . .	„ „	1,000	„
Norwège . . .	„ „	1,000	„
Écosse . . .	„ „	1,000	„
Angleterre . . .	„ „	1,000	„

Ce qui a de quoi surprendre, dans ce tableau, mais ce dont il importe de pénétrer les raisons, c'est la faible mortalité relative de la tuberculose en Angleterre.

Comment l'Angleterre a pu enrayer les progrès de la tuberculose.

L'Angleterre est, en effet, le pays le plus industriel de l'Europe. La misère y est grande, le climat est pluvieux et humide . . . . il semblerait donc qu'il doit être le pays le plus atteint par la tuberculose.

Mais si l'Angleterre présente une si basse mortalité, cela tient, dit Brouardel, "à ce que, depuis 1851, les prescriptions d'hygiène qui sont encore discutées et à peine appliquées sur le continent, ont reçu une application méthodique."

L'Angleterre en 50 ans a fait baisser son chiffre de mortalité tuberculeuse de 14 pour 10,000 habitants et dans les 20 dernières années de 4·4.

Par quel moyen?

Dans une lettre que M. le Dr. Thorne-Thorne adressait au Professeur Brouardel, il donne les raisons qui à son avis expliquent cette décroissance de la léthalité tuberculeuse en Grande Bretagne.

1°. Disparition des maisons insalubres entraînant avec elles la disparition de l'encombrement des cours, ruelles, et culs de sac.

Conditions imposées aux nouvelles bâtisses d'être faites entre cour et jardin, de manière à donner aux chambres de l'air et de la lumière et une aération permanente aux maisons.

2°. Démolition d'habitations humides et drainage du sous-sol.

Modification des nouvelles maisons et cottages pour que le sol et les murs soient absolument à l'abri de l'humidité.

3°. Progrès analogues réalisés dans les casernes, écoles, grands établissements assurant à tous ces édifices de la lumière et une aération permanente de jour et de nuit.

4°. Amélioration des usines pour protéger les intéressés contre l'inhalation des poussières noires; aération des manufactures.

5°. Le développement des sociétés co-opératives, ayant augmenté le bien-être des classes laborieuses, qui ont actuellement des logements confortables, une nourriture meilleure et dont les enfants sont soumis à certaines conditions protectrices.

Il semble donc que ces mesures si bien comprises aient été pour beaucoup dans la diminution de la mortalité anglaise. L'Angleterre a compris en partie la solution de la question.

En relevant le bien-être des classes pauvres et laborieuses, en améliorant les conditions du travail, de l'alimentation et de l'habitation, on a pu diminuer la tuberculose de plus de la moitié.

Il existe aussi en Angleterre toute une série de sociétés et d'associations qui ont chacune une mission d'assurer la réalisation d'une mesure ou d'un groupe de mesures prophylactiques; Brouardel les énumère:

Les "building societies," sont des caisses d'épargne qui procurent des maisons à leurs membres, et actuellement elles comptent plus d'un million d'adhérents dans le Royaume-Uni.

Les "Labouring Classes Lodging Houses Acts" (1851–1866–1867) forment ensemble des lois qui stimulent les paroisses et les municipalités des villes de plus de 10,000 habitants à construire des maisons salubres.

Les "Acts for the Removal of Nuisances" (1855–1866–1874) accordent aux autorités locales le droit d'inspection des maisons ouvrières et fixent les amendes pour contraventions aux lois et règlements.

Les "Artisans' Dwellings Acts" (1868–1882) appelés également "Torrens' Acts," ont pour but primordial la réparation de la démolition des maisons insalubres; ils permettent aussi de supprimer les bâtiments obstructeurs, c'est-à-dire, ceux qui enlèvent l'air et le jour à d'autres maisons et empêchent la ventilation.

Les "Artisans' and Labourers' Dwellings Improvements Acts" (1875–1882) obligent les municipalités de démolir les logements insalubres, et à fournir un logement aux personnes qui, par suite de cette mesure, se trouveraient sans abri.

La défense contre la tuberculose en Allemagne.

La mortalité tuberculeuse a encore très sensiblement diminué en Allemagne. On sait, d'ailleurs, avec quel zèle aujourd'hui récompensé l'Allemagne a déclaré la guerre à la tuberculose.

Le Professeur Krause, dans une intéressante étude sur la diminution de la mortalité en Prusse, constate "que la mortalité, qui était en 1875 de 31·9 pour 10,000 habitants, est tombée en 1894 à 23·9, d'où une diminution de $\frac{1}{3}$.

Si la mortalité par la tuberculose d'après le Dr. Aron a diminué dans les dernières années en Allemagne, nous ne devons pas attribuer ces résultats encourageants seulement à l'influence des crachoirs et des mouchoirs et autres prescriptions hygiéniques. Il y a d'autres considérations de majeure importance. La législation a amélioré l'état économique de la classe ouvrière en

Allemagne. L'organisation des caisses d'assurances contre la maladie, si merveilleusement comprise, permet à l'ouvrier de se soigner en temps utile, c'est-à-dire au début même de son mal.

Est-ce à dire que toutes ces mesures soient applicables dans tous les pays, et que la défense pratique contre la tuberculose doive s'inspirer d'un modèle unique?

Assurément Non!

Sanatorium, Dispensaire, Surveillance sanitaire.

Toutefois les mesures qui à l'heure actuelle retiennent l'attention des hygiénistes, des philanthropes et des gouvernements, parce que ce sont celles qui, de beaucoup, ont donné le plus rapidement les meilleurs résultats, relèvent de deux vues différentes.

D'une part la création des sanatoria, établissements que des combinaisons financières arriveront peut-être un jour à rendre de création et d'entretien moins dispendieux, mais qui pour l'instant ne recueillent qu'un nombre restreint de malades, eu égard à leur totalité, et ne fonctionnent pas gratuitement. Les moins chers coûtent trop pour la bourse des pauvres, et sont très onéreux pour les caisses d'état. Les autres sont réservés aux riches.

D'autre part, les dispensaires anti-tuberculeux et la surveillance sanitaire qui s'inspirent d'une pensée vraiment démocratique, qui répondent aux désirs de la plupart des malades: pouvoir se soigner sans renoncer complètement à leur travail; recevoir des soins chez eux et continuer de vivre au milieu de leur famille, sans être un danger pour elle, grâce aux précautions qu'on leur indique et à l'éducation qu'on leur inculque.

Mais quelle que soit la méthode employée isolément par une nation, le résultat sera bâtard et incomplet. Pour espérer un effet sérieux et efficace il faudrait que *la prophylaxie anti-tuberculeuse soit internationale.*

Il y a des essais nés d'hier qui ont donné déjà mieux que des espérances, qui gagneraient à être étudiés, comparés, améliorés au cours d'une conférence internationale.

Nous estimons, en effet, que la prophylaxie anti-tuberculeuse doit être internationale. L'hygiène internationale a eu surtout pour objet, jusqu'à ce jour, de préserver les nations européennes de maladies de formes épidémiques toute spéciales et qui sont jusqu'ici en réalité au nombre de trois: le choléra, la peste, et la fièvre jaune. On objecte que la tuberculose ne ressemble en rien à ces maladies épidémiques, qu'elle revêt plutot un caractère endémique. Cela est inexact au vrai sens du mot. On sait en effet que certaines tribus sauvages sont restées longtemps indemnes du bacille de Koch, dont elles sont devenues tributaires le jour où les races civilisées sont venues leur apporter la néfaste contagion. La tuberculose, qui est une maladie purement contagieuse et épidémique, a une allure différente des épidémies citées ci-dessus, mais, comme elles, la bacillose est épidémique et évitable. C'est même d'après nous la plus épouvantable des épidémies, car son bacille pathogène est si vivace qu'il dépasse en virulence et en persistance la plupart des autres

microbes pathogènes. Tout comme nous mêmes, le bacille de Koch peut faire des longs voyages sans mourir, il peut traverser, franchir des frontières, et il les passe hélas trop souvent, pour aller d'un pays à un autre avec les échanges commerciaux de toutes sortes, par les wagons de chemins de fer, par les navires, etc. C'est pourquoi nous déclarons qu'aucun effort isolé d'une seule nation ne sera sanctionné d'un résultat certain, définitif. La prophylaxie la plus logique, la mieux réglementée, appliquée dans un pays unique, n'atteindra jamais le but espéré, si les pays limitrophes et même éloignés ne prennent des mesures prophylactiques à peu près semblables. Dès lors nous sommes en droit de nous demander pourquoi la prophylaxie tuberculeuse ne ferait-elle pas l'objet d'une législation sanitaire internationale ?

Pourquoi ne serait-elle pas débattue au sein d'une conférence comme celles qui à Rome en 1865, à Venise en 1892, à Dresde en 1893, à Paris en 1894, à Venise en 1897, fixèrent les moyens communs de défense contre le choléra, la peste, la fièvre jaune ?

Une commission composée de représentants autorisés pour les diverses nations recevrait la mission de comparer entre elles les mesures qui dans leurs pays respectifs seraient appliquées et donnerait les meilleurs résultats.

Cette commission, cet office central, aurait pour mission corollaire de rédiger une sorte de code prophylactique international contre la tuberculose, code qui une fois adopté aurait force de loi dans tous les pays.

S'il est une question qui soit d'essence universelle, c'est bien celle de la tuberculose. Elle ne peut recevoir de solution efficace que de l'union de toutes les intelligences et de toutes les bonnes volontés.

Projet d'Entente Internationale pour la Lutte contre la Tuberculose. Une Commission Sanitaire.

Nous nous sommes adressés à un très grand nombre de phtisiologues de tous les pays d'Europe pour leur demander comment leurs gouvernements respectifs avaient organisé la lutte contre la tuberculose. La plupart des savants ont répondu que cette défense était à peine ébauchée et qu'il restait beaucoup à faire. Mais nous ajoutons que même des mesures prophylactiques bien comprises et rigoureusement appliquées dans un seul pays, dans une seule contrée, n'auraient pas de résultats définitifs. En effet, les relations commerciales et industrielles sont aujourd'hui si intimes entre les différentes nations, les trafics et les transactions internationaux sont si nombreux, que fatalement ces échanges entraînent des faits de contagion, et les mesures d'hygiène prises dans un pays unique, ne pourraient être jamais couronnées de succès. " C'est pourquoi nous proposons à nos collègues du Congrès la nomination d'une commission internationale semblable à celle qui fonctionne pour le choléra et la peste. Cette commission, où tous les pays auront un ou plusieurs représentants autorisés, se réuniront sur un terrain neutre afin d'étudier les moyens les plus efficaces pour la défense commune contre la tuberculose. Les savants édicteront des mesures prophylactiques qui auront partout force de loi, parce que leur application sera rendue obligatoire par les divers gouvernements."

DIVISION III.

PART II.

THE RELATION OF BOVINE TO HUMAN TUBERCULOSIS.

PROFESSOR DELÉPINE (Manchester): It was my intention to begin straight away with the subject of my address to-day, but I read yesterday the account of another address which has given me so much concern, and seems to me to be of such great importance, that I feel bound to offer some remarks about it first. In the face of facts which have been slowly accumulating it seems extraordinary that Dr. Koch, two days ago, should have felt it desirable to state, without giving adequate reasons, that the transmissibility of bovine tuberculosis to man, and of human tuberculosis to cattle, was not proved. It is certainly hard to disagree with so high an authority as the discoverer of the tubercle bacillus and of tuberculin, and it is as ungrateful to do so as it is hard. I hold, however, that Dr. Koch, more than any other, was bound to give good scientific evidence before expressing an opinion which is bound to have very considerable influence upon the people who have no means of obtaining experience for themselves. (Hear, hear.) Differences in the morphology of the bacillus and other differences attributable to variation are not sufficient to prove that two different samples of an organism do not belong to the same species. On the other hand, we have in connection with bovine and human tuberculosis a number of facts which I think must be taken to be unanswerable until some discovery is made that will open our eyes to the nature of the facts, which seem absolutely clear to us at the present time, but which may have misled us. First of all, there are authentic cases of veterinary surgeons who have been infected with bovine tuberculosis. These cases are well known and recorded, and in some of them generalised tuberculosis has been produced. Secondly, we have the evidence that a number of the lower animals—calves, pigs, kittens, young dogs, and guinea-pigs—when fed on human tuberculous products, are all liable to take tuberculosis. We have, if I remember well, in connection with the work of the Royal Commission on Tuberculosis, some experiments, made by Dr. Sidney Martin, showing that calves were liable to infection from human tuberculous sputum. Then, thirdly, tuberculous lesions are produced in certain experimental animals, such as guinea-pigs, by inoculation of tuberculous products of either origin. That is to say, whether we use human tuberculous sputum or tuberculous matter taken from bovine lesions, we obtain tuberculous lesions resembling each other very closely. Finally, we have the results obtained with Koch's own tuberculin.

It is possible to prepare tuberculin from bacilli obtained from various kinds of animals, from bovine tubercle bacillus, or human tubercle bacillus; and various animals affected with tuberculous lesions react to tuberculin of various sources in the same way—that is to say, the tuberculin reaction can be obtained with tuberculin obtained from bacilli coming from various different kinds of animals, and *vice versâ*. (Hear, hear.) I think therefore that, in the absence of extremely strong scientific evidence, Dr. Koch was not justified, notwithstanding his very high position, in making statements which will make administration extremely difficult. I am therefore anxious to put forward the following motion, which I think expresses the feeling of the President of this Section (Sir Herbert Maxwell), Dr. Niven, Dr. Newsholme, and Dr. Bulstrode, and which I will read to you: "That, in the opinion of the State section of this Congress, the statement made by Professor Koch as to the danger of consuming tuberculous meat and milk may give rise to serious administrative difficulties in this country. Such difficulties can only be removed by the confirmation or disproval of Professor Koch's conclusions. This Section is therefore of opinion that it devolves upon the State to institute forthwith an inquiry, with a view of setting at rest the doubts which have been raised. The Section is further of opinion that the Congress as a whole should appoint a deputation of its members to wait upon the President of the Local Government Board, and upon the President of the Board of Agriculture, for the purpose of bringing these views to their notice." (Cheers.)

THE PRESIDENT: Professor Delépine's paper on the mode of applying the tuberculin test stands first on the Paper, and it is for you, ladies and gentlemen, to say whether you will give precedence to the very important and weighty Resolution which he has just moved.

The Section granted the precedence.

DR. ROBERTSON (Sheffield): I have great pleasure in seconding Professor Delépine's Resolution. As one who has to do with administration work in regard to the prevention of tuberculosis, I feel very strongly that one's position will be considerably weakened unless some action is taken, and taken speedily, to undo what has been done during the last day or two. From a great deal of experience in dealing with tuberculous material from human beings and from animals, one cannot help feeling that not sufficient proof has been given by Professor Koch, and that one must go on as we have been doing until the results of very careful and searching inquiry have been made known. I have therefore very great pleasure indeed in seconding the Resolution.

THE PRESIDENT: In putting this Resolution to the meeting, and as Professor Delépine has done me the honour of mentioning it as having my approval—which indeed it has—(cheers)—I should like to say a few words as

to my position in the matter. Of course everyone in this room is aware that my opinion upon a highly technical and abstruse problem such as this is worthless. (No, no.) My only connection with the subject arises from the fact that I was Chairman of the Royal Commission on Tuberculosis which reported in 1898—(cheers)—and the reason why I feel the great gravity of the circumstances which have arisen out of the recent announcement by Professor Koch is that, if his latest proposition proves to be well founded, then the Report of my Royal Commission was proceeding on a mistaken basis, because we accepted the Report on experiments by a previous Royal Commission—Dr. Sidney Martin's experiments and others—which led, as you know, to a totally different conclusion from that now arrived at by Professor Koch. Having said these few words in explanation of my connection with this question, I will now put the Resolution to the meeting: "That, in the opinion of the State Section of this Congress, the statement made by Professor Koch as to the danger of consuming tuberculous meat and milk may give rise to serious administrative difficulties in this country. Such difficulties can only be removed by the confirmation or disapproval of Professor Koch's conclusions. This Section is therefore of opinion that it devolves upon the State to institute forthwith an inquiry, with a view to setting at rest the doubts which have been raised. The Section is further of opinion that the Congress as a whole should appoint a deputation of its members to wait upon the President of the Local Government Board, and upon the President of the Board of Agriculture, for the purpose of bringing these views to their notice."

The Resolution was put and carried unanimously.

THE CONTROL OF MILK SUPPLIES.

HOW CAN THE TUBERCULIN TEST BE UTILISED FOR THE STAMPING OUT OF BOVINE TUBERCULOSIS?

By SHERIDAN DELÉPINE, M.B., B.Sc.,

Procter Professor of Pathology and Director of the Public Health Laboratory, Owens College, Manchester.

A DISCUSSION of the means at our disposal for the prevention of tuberculosis in cattle does not necessarily include any consideration of the prevention of tuberculosis in man. I wish, however, to explain at once that it is owing to the intimate relations of bovine and human tuberculosis that I have been gradually driven to the study of a subject which otherwise would have been outside my regular sphere of work. Such a study is of importance to public health, directly by giving us the power to deal with one of the

sources of human disease, and indirectly as an object-lesson, for it is possible to obtain far more accurate data regarding the spread and prevention of tuberculosis in the lower animals than in man.

FIRST PART.

DIAGNOSIS.

A. *Preliminary Remarks.*

1. *Need of reliable diagnostic methods as a basis for administration.*—Administrative measures may have for object the stamping out of cattle tuberculosis, or simply the exclusion of tuberculous products from our food markets. In either case reliable methods of diagnosis of tuberculosis, or of tuberculous products, during the life or after the death of tuberculous animals, are of fundamental importance. The most perfect administrative methods would be wasteful and useless without good and accurate methods of diagnosis. Before dealing with tuberculous animals, it is necessary to know how to find them.

2. *Importance of good administration, without which the best methods of diagnosis would be fruitless.*—On the other hand, diagnosis, however perfect, would become fruitless unless utilised by good administration, not prohibitive by its cost, not exasperating by unnecessary interference, but at the same time thorough in its effects.

3. *Objects of legislation against cattle tuberculosis.*—Some confusion has been created by the fact that legislation has not always distinguished clearly between the methods necessary for—

1st. The protection of man against the dangers resulting from the consumption of tuberculous products and other modes of infection from cattle.

2nd. The prevention of tuberculosis in cattle, prevention which always presupposes some preliminary process of elimination of existing tuberculous cattle.

The first object concerns chiefly the sanitarian. The second object is of the utmost importance to the sanitarian, but it is of no less moment to the agriculturist. It is not only because the interests involved are not the same that such a distinction is necessary, for methods which appear to be sufficient to protect man may be, and, as a matter of fact, are, quite insufficient to deal with the more general object, viz., the elimination of tuberculosis from our herds. The reverse is not true, for the stamping out of tuberculosis would reduce public health legislation to methods of control having simply for object to ascertain whether the general work of prevention is thoroughly carried out.

4. *Prevention of infection of man by tuberculous cattle.*—Now, the detection of the tubercle bacilli in products which are intended for the consumption of man, is based on methods quite different from those which are used for the

detection of tuberculosis in living cattle; and the first are very much more under the control of sanitary authorities than the second.

Thanks to our slowly acquired knowledge of the morbid anatomy of tuberculous lesions, to the demonstration of their infectivity by Villemin, and to the means which Koch's discoveries have given us for detecting the tubercle bacillus, it is now comparatively easy to recognise whether a carcase, milk, butter, cheese, or even a dwelling are infectious or not.

It is, therefore, possible, though not easy, by vigilant inspection to rid our markets of many tuberculous products; it is even practicable, as Dr. Niven has shown, by a thorough and skilful application of the Manchester Milk Clauses to reach many of the living animals which are the source of infection of some of those products, and by eliminating these animals, to diminish the chances of further infection. It is not within the scope of this paper to enter into a discussion of this aspect of prevention, which I mention here only because I will have to allude to it in discussing the more general measures.

5. *Prevention of tuberculosis in cattle.*—The question before us is the *stamping out of bovine tuberculosis*, and more specially *how the use of tuberculin can assist us in obtaining this result.*

The prominence given to tuberculin in this discussion is due to the fact that in our opinion, as well as in that of the most competent authorities, Koch's discovery of tuberculin has given us the most efficient means of diagnosing tuberculosis during life. In my estimation the keystone of preventive measures is diagnosis by reliable and readily applicable methods.

6. *Diagnosis by the tuberculin test: its reliableness supported by the weight of expert evidence.*—I might be excused if after stating this view, supported as it is by the weight of the highest authorities, I made no further attempt to prove its correctness.

By following such a course, my right to express a definite opinion might be challenged, and I might offer further food for the criticism of those who are still supporting our responsible governments in their attitude of agnosticism. Such an attitude is well expressed by the Right Honourable Walter Long, the late President of the Board of Agriculture, in his 1899 Newcastle speech, in which he is reported to have said:—

7. *Value of the tuberculin test not universally accepted. Opinion of Mr. Walter Long (Minister of Agriculture).*—(*a.*) The data were still too indefinite and wanting in preciseness to justify them (the Government) in asking Parliament for great votes of public money, or to impose on stock-keepers compulsory measures entailing great loss.

(*b.*) They were not yet sure that those measures would be effectual.

(*c.*) The tuberculin test might be administered so as to render cattle incapable of reaction on a second application of the test, and that might be productive of fraud.

(*d.*) People who had studied the question most closely were not agreed as to the conditions under which the test should be applied.

(*e.*) The disease was difficult of detection unless one could rely on some such discovery as the tuberculin test.

(*f.*) At present too little was known, too much doubted, for Parliament to be justified in imposing upon the country heavy expenditure on wholesale restrictions, which would be strongly resisted in many quarters, and which might not do anything effectual for the extinction of the disease (*Manchester Guardian*, January 30, 1899).

I may say that Mr. Long had not expressed himself quite so unfavourable at Sudbury in 1898, where, at Lord Vernon's request, I had the honour of addressing a meeting in his presence, yet, even then, he showed clearly that the Government could not be expected to move unless there was a strong expression of public opinion and agreement among experts.

8. *Observations by Schütz, of Berlin, and opinion of Bang, of Copenhagen.*—Mr. Long's contentions receive support from Schütz's observations. This observer tested sixty-six head of cattle; fifty-one reacted, of which forty-three only were tuberculous; fifteen did not react, and of those four were tuberculous.* Mr. Long's objections are also supported by statements made previously by Professor Bang at the *Congrès pour l'Étude de la Tuberculose chez l'homme et chez les animaux*, held at Paris in 1898 (*La Semaine Médicale*, 1898, p. 329).

"Chaque fois que l'épreuve par la tuberculine a donné une réaction typique, on peut considérer l'animal soumis à l'expérience comme sûrement tuberculeux. La proposition inverse n'est malheureusement pas toujours vraie, et il est reconnu que *des animaux n'ont pas réagi à la tuberculine alors qu'ils étaient porteurs de lésions tuberculeuses, même avancées et disséminées.* Aussi, en l'absence de réaction à l'égard de la tuberculine, ne faut-il pas négliger de procéder à un examen clinique approfondi des animaux suspects. En dehors de ces cas, qui ne sont pas absolument exceptionnel, on sait *que des injections répétées de tuberculine peuvent immuniser* un animal, et après plusieurs épreuves positives, le rendre réfractaire à une nouvelle inoculation—le fait pourrait être exploité dans le commerce dans un but de fraude.

"De plus, j'ai remarqué que des bêtes isolées à la suite d'une réaction typique, ne réagissaient plus l'année suivante; dans quelques cas l'épreuve devenait négative, après que ces animaux avaient nettement réagi plusieurs années de suite. Ce defaut de réaction indique généralement des lésions peu avancées et en voie de régression, mais il peut être la conséquence d'une tuberculose très avancée et éminemment contagieuse. Il vaut donc mieux s'en tenir à la première épreuve, si elle a été typique, et ne pas la renouveler.

"Enfin chez les animaux surmenés par un voyage ou l'exposition dans des marchés, on a noté une diminution ou une perte temporaire de la faculté de réagir à la tuberculine. On ne doit donc tenir pour certaine cette épreuve pour le bétail du commerce que si elle a été pratiquée après plusieurs jours de repos. Ces causes d'erreur étant signalées, il faut se hâter de dire que

* Schütz: 'Arb. d. Kaiserl. Gesundheitsamte,' Band VIII.; see also Nocard: 'Annales de l'Institut Pasteur,' 1892, VI., p. 50.

la tuberculine n'en reste pas moins le meilleur moyen de diagnostic de la tuberculose."

Mr. Walter Long's criticism, which was made some time after the publication of Professor Bang's communication, seems, therefore, to express identical views. A careful consideration of Professor Bang's statements will, however, show that they do not justify scepticism. Bang emphasises the reliability of positive reactions in the great majority of cases; he points out the conditions which may bring about failure of reaction, and also the ways by which such errors may be avoided or considerably reduced. He shows also that the tuberculous cases which do not react are: *first*, cases in an advanced state of tuberculosis (*i.e.*, those which can be easily diagnosed by other means); *second*, cases which have previously reacted and have acquired tolerance; *third*, cases in which a slight tuberculosis has been present, but in which the process is becoming arrested. I will be able to show that such cases should be no obstacle to proper administration. I wish also to emphasise the fact that although Professor Bang's restrictions may have been used by others for purposes of adverse criticism, their author is not responsible for this, and is undoubtedly one of the earliest and strongest supporters of the use of tuberculin in diagnosis.

9. *Evidence in favour of the value of tuberculin. Summary of early experiments.*—We have, on the other hand, statements made by equally reliable and recognised authorities which are entirely favourable to tuberculin. I will not lengthen this communication by a detailed account of all the records available. My purpose will be equally well served by quoting the conclusions which have been arrived at by Professor Nocard and by the Royal Commission on Tuberculosis, after a careful compilation of records available and the carrying out of confirmatory experiments.

Nocard, in 1892, gave in the 'Annales de l'Institut Pasteur' (Vol. VII., p. 44) a very useful summary of the earlier work done soon after the announcement of Koch's discovery of tuberculin. The observations analysed by him include those of Guttmann, of Dorpat (1890); Rœckl and Schütz, of Berlin (1891); Bang and Salomonsen, of Copenhagen (1891); Lydtin, of the Duchy of Baden (1891); Jöhne and Siedamgrotski, of Dresden (1890); Nocard, of Paris (1891). Only experiments controlled by post-mortem examinations form the basis of Nocard's conclusions. I should say that some of the precautions necessary to ensure the efficiency of the test had not yet been fully appreciated then; this may account for the cautious manner in which he expresses himself. In a later publication (Nocard: "Les Tuberculoses Animales") the author shows that this caution does not indicate any doubt as to the extraordinary value of tuberculin properly used, and concludes by saying: "Tout le monde admet aujourd'hui l'exactitudeet la précision merveilleuse des indications diagnostiques fournies par la tuberculine."

10. *Professor Nocard's conclusions*, 1891.—"(1) La tuberculine possède, à l'égard des bovidés tuberculeux, une action spécifique incontestable, se traduisant surtout par une notable élévation de la température.

(2) L'injection d'une forte dose (de 30 à 40 centigrammes, suivant la taille des sujets) provoque ordinairement, chez les tuberculeux, une élévation de température comprise entre 1 et 3 degrés.

(3) La même dose injectée à des bovidés non-tuberculeux, ne provoque ordinairement aucune réaction fébrile appréciable.

(4) La réaction fébrile apparaît le plus souvent entre la 12e et la 15e heure après l'injection, quelquefois dès la 9e heure, très rarement après 18 heures; elle dure toujours plusieurs heures.

(5) La durée et l'intensité de la réaction ne sont nullement en rapport avec le nombre et la gravité des lésions; il semble même que la réaction soit le plus nette dans le cas où, la lésion étant très limitée, l'animal a conservé les apparences de la santé.

(6) Chez les sujets très tuberculeux, phthisiques au sens propre du mot, chez ceux surtout qui sont fiévreux, la réaction peut être peu accusée ou même absolument nulle.

(7) Il est prudent de prendre la température des animaux, matin et soir, pendant plusieurs jours avant l'injection; il peut s'en trouver en effet qui, sous l'influence d'un malaise passager d'un état pathologique peu grave (troubles de la digestion ou de la gestation, chaleurs, etc.), présentent de grandes oscillations de la température; de là une cause d'erreur grave. Pour ces animaux, il vaut donc mieux ajourner l'opération.

(8) Chez certains animaux tuberculeux, non fiévreux, la réaction consécutive à l'injection de tuberculine ne dépasse guère un degré, néanmoins, comme l'expérience démontre que, chez les animaux parfaitement sains, la température peut subir des variations atteignant un degré et plus, on devra ne considérer comme ayant une valeur diagnostique réelle que les réactions supérieures à 1·4°; l'élévation de température inférieure à 8 dixièmes de degré n'a aucune signification; toute bête dont la température subit une élévation comprise entre 0·8° et 1·4°, sera considérée comme suspecte, et devra être soumise, après un délai d'un mois environ, à une nouvelle injection d'une dose plus considérable de tuberculine."

To these first conclusions Nocard added, a few years later, the following ("Les Tuberculoses Animales," p. 76):—

"(*a.*) Les injections successives, répétées chaque jour ou à quelques jours d'intervalle, donnent des réactions graduellement moins intenses. Il se produit une véritable accoutumance à l'action de la tuberculine. Mes expériences semblent d'établir que cette accoutumance est très passagère; chez plusieurs vaches tuberculeuses soumises aux injections, tous les quinze jours, tous les douze jours ou tous les huit jours, j'ai enregistré huit ou dix fois de suite des hyperthermies sensiblement égales.

"(*b.*) Le veau tuberculeux réagit aussi bien que l'adulte; la dose doit varier de 10 à 20 centigrammes;

"(*c.*) Les injections de tuberculine n'ont aucune influence fâcheuse sur la quantité et sur la qualité du lait ou sur l'issue de la gestation. Cela résulte d'un nombre considérable d'expériences faites sur des vaches en pleine lactation et à toutes périodes de la gestation."

11. *Finding of the Royal Commission on Tuberculosis*, 1898.—After quoting Professor MacFadyean's opinion, and his "most implicit faith in tuberculin as a test for tuberculosis, when it is used on animals standing in their own premises and undisturbed," the Royal Commissioners in their report on tuberculosis state :—

"We entirely accept these conclusions, and entertain no doubt as to the value of tuberculin, provided the test is applied by a competent veterinary surgeon, and that the tuberculin is of trustworthy quality." (Report of the Royal Commission, Part I., Art. 13, p. 4, 1898.)

B. *Criticism of previous experiments regarding the value of tuberculin.*

12. *Discussion of some of the causes of discrepancies among observers. Sources of experimental error.*—It is not difficult to account for the differences of opinion which have arisen out of the results of early experiments with tuberculin.

1st. *The reaction is manifested by a rise of temperature, but, as Nocard and other observers have frequently observed, this rise of temperature is characteristic only under certain conditions which must be observed in order that the results should be reliable.*

(*a.*) The animal submitted to the test should not be at the time subject to *sudden variations of temperature* or be suffering from *pyrexia*. Before applying the test it is therefore necessary to observe the animal for two or three days and take its temperature morning and evening. *Recently driven cattle* should be tested only after they have been submitted to this preliminary observation.

(*b.*) In tuberculous animals a *characteristic rise of temperature* is usually observed between the eighth and fifteenth hour, but it is occasionally, though very rarely, observed after the eighteenth hour.

(*c.*) A slight rise of temperature not amounting to more than 1° C. above the normal temperature of the animal cannot be considered characteristic, since healthy animals are liable to fluctuations of temperature capable of producing such a rise. It is therefore desirable to adopt some scale similar to that recommended by Nocard, who considers—

a rise of 0·8° C. (1·4° F.) as having no significance.

a rise of 0·8° to 1·4° (1·4° to 2·5° F.) as being only suspicious and requiring the confirmation of a further test at the end of a month.

a rise of 1·5° to 3° C. (2·5° to 5·4° F.) as characteristic of tuberculosis when the conditions previously stated have been observed.

(*d.*) It is almost useless to add that no *tuberculin* should be used which does not come *from a reliable source*, or which has been exposed to loss of activity by long keeping. The exact dose of each preparation should be carefully ascertained.

Many of the earlier observers have not paid sufficient attention to these

precautions. Thus Schütz has considered a rise of 0·5° as indicating a tubercular reaction.

MacFadyean, who soon after the introduction of tuberculin had obtained unsatisfactory results, explained clearly in 1896 (Report of the Royal Commission on Tuberculosis, 1898, Part II., Minutes of Evidence, p. 62) the sources of error. Speaking of his first set of experiments, he says: "These, however, were not entirely favourable to the use of tuberculin . . . . but since that, experiments and observations made under somewhat different circumstances have yielded entirely different results, and I have the most implicit faith in tuberculin as a test for tuberculosis, when it is used on animals standing in their own premises or undisturbed. It is not a reliable test when used on cattle in a market or in a slaughter-house, or on any cattle that have been shipped or trained or otherwise excited. That has been found since I made my report. Other observers have had similar results under similar circumstances."

2nd. *Sufficient care has not always been taken to make a thorough post-mortem search for minute tuberculous lesions on animals which had reacted.* In the absence of very careful and minute examination, it is unscientific to report an entire absence of tuberculosis. Several unusual tuberculous lesions have frequently been sent to the writer by very competent men who could not determine their nature, and in some cases it was only after microscopical examination or inoculation that the exact nature was ascertained. This has occurred specially frequently in connection with tuberculosis of the udder, but has also occurred in connection with tuberculosis of glands, pericardium, air passages, bones, etc.—Jöhne and Siedamgrotzki had already pointed out in 1890 that even a careful inspection of a dressed carcase is not sufficient to allow anyone to certify that a carcase is free from any tuberculous lesions, specially of lymphatics and of bones.*

3rd. *The absence of reaction in animals suffering from advanced tuberculosis does not affect the value of the test.*—The absence of reaction is only what can be expected in the case of animals which are already saturated with the products of the tubercle bacillus. This state is probably analogous to the state of tolerance produced by *frequently* repeated doses of tuberculin. But when cows have reached such a stage of tuberculosis their condition should be obvious to a competent veterinary surgeon, and as most of these cases would be suffering from advanced phthisis, the clinical diagnosis could be confirmed by the bacteriological examination of mucus obtained by swabbing the pharynx according to the method recommended by Greffier. To excite secretion, pilocarpine, 25 to 30 centigrammes, may be previously injected. (Bulletin de la Société Centrale de Médecine et Vétérinaire, 1890, p. 445.)

4th. *The absence of reaction in the case of animals in a very early stage of tuberculosis* will, I think, be found to be very rare when the

* See also Nocard, *l.c.*, p. 79.

test is properly applied. The most remarkable feature of the tuberculin test is the power it gives to detect extraordinarily small lesions, and it is this property which, I think, renders it so specially suitable as a basis for preventive methods, and will allow such methods to be carried out economically—*i.e.*, before infected animals have lost their value on the meat market.

But even if a few escaped, it is obvious that early tuberculous lesions could hardly be a source of infection in other animals, and that under a regular and thorough system of inspection those animals would be detected before they had become a source of danger to other animals or to man.

5th. *With regard to the tolerance acquired* by cattle which have been tested several times, I can best indicate to what an extent this might be a source of difficulty by giving the results of some experiments made for the Cheshire County Council by Mr. Laithwood, Chief Veterinary Inspector for the county. I was able to get well acquainted with these experiments, being engaged at the time in another branch of the same investigation. In the space of eighty days several cows were tested five times at variable intervals.

The results are given in the following table :—

13. *Cheshire County Council's experiment on tolerance to tuberculin.*

Reference No. of Cow.	1st testing.	2nd testing 45 days after 1st.	3rd testing 13 days after 2nd.	4th testing 14 days after 3rd.	5th testing 12 days after 4th.	Result of post-mortem, and Remarks.
5	? +	? +	–	? +	–	Case of Distomatosis, temperature irregular.
24	+	+	+	+	–	Advanced tuberculosis.
32	+	+	+	+	+ ?	Slight tuberculosis.
37	+	+	+	+	–	Slight tuberculosis.
41	+	+	+	+	–	Advanced tuberculosis.
42	+	+	? –	+	–	Advanced tuberculosis.
27	+	+	(not tested).	+	(not tested).	Advanced tuberculosis.
35	?	–	(not tested).	–	(not tested).	Healthy.
51	+	+	(in calf, not tested).	+*		Tuberculosis slight.

* Tested later than the others.

Three of the cows which had ceased to react were found to be still in the same state thirty-five days after the last test.

This table is interesting because it shows that the effects of repeated injections of tuberculin are not so rapid as has been supposed; thus it was only at

the fifth injection that five of the tuberculous cows ceased to give a typical reaction, and this fifth injection had followed the fourth, third and second testings at intervals of only twelve, fourteen and thirteen days respectively. It will also be noticed that the only cow (32) which gave any evidence of reaction on the fifth testing was one in which only slight tuberculous lesions were found post mortem. With regard to cow 37, which was also very slightly diseased, and gave several good reactions, it was reported as being free from visible tuberculous lesions at the post-mortem examination. Some lymphatic glands were, however, found enlarged and sent to me for examination: I found in them tubercle bacilli (at the time of this microscopical examination I was unacquainted with the results of the test or of the autopsy). These experiments also show the danger of not having animals to be tested under observation for some days before testing. Cow 5 appeared to give a reaction on at least two occasions, and gave none on two other occasions, but it was found afterwards that the cow had a very irregular temperature, at the post-mortem examination it was found to be free from tuberculosis; but extensive hepatic distomatosis was discovered. Nocard has recorded a similar case. With regard to cow 35 the temperature reached 103·2° at the first testing, but no reaction was obtained afterwards. Immediately before the first injection the temperature was 103°—*i.e.*, the injection had produced no material increase of temperature. This cow was found afterwards to be healthy.

It is unfortunate that Mr. Laithwood did not deem it necessary to take the temperature of each cow more than once before testing, nor beyond the fifteenth hour after testing. The temperatures recorded by him as indicating a reaction are in some cases very low, and have not the full significance which they would have had if he had made at least one or two more observations before and after testing. From his own records it is probable that the temperature had not reached its acme in all cases at the fifteenth hour.

Nocard had previously obtained more carefully tested results showing that tolerance to tuberculin is not so easily produced as has been stated.

The fear of fraud cannot, either, be considered a very sound argument against the use of a good method. Administrators have in other matters known how to deal with dishonesty.

C. *New Experiments.*

14. *Some recent observations regarding the value of tuberculin.*—Having given an account of some of the evidence already available, I must now record the results of experiments which have been conducted under my supervision since 1897, and in which an attempt has been made to observe all the precautions necessary to avoid fallacies which have been previously discussed. I will also take advantage of the extensive investigation carried out in Aberdeen on behalf of the University Department of Agriculture in 1899.

15. *The Ford Bank experiments.*—As a result of a conversation which I had with him, Mr. Gair Ashton, M.P., in 1897, decided to test practically the possibility of stamping out tuberculosis from the herd kept on his estate at Ford Bank. The probable cost of the experiment, which I fully explained, did not deter him, and with great liberality and public spirit he gave me the means of obtaining all the information which I could obtain from such an experiment.

The small herd kept at Ford Bank consisted in 1897 of twenty-one cows, bullocks, heifers, and calves, several of which were tuberculous. The problems before us were :—

1st. To stamp tuberculosis out of Ford Bank;
2nd. To estimate the cost of this radical procedure;
3rd. To keep the new stock free from tuberculosis.

Briefly speaking, these experiments were conducted as follows :—All the stock on the farm was tested with tuberculin by Mr. Locke, assisted at first by Mr. King, the Corporation Chief Veterinary Inspector, and afterwards by Mr. Holburn, Mr. King's successor. The test was applied with all the precautions I thought necessary, and which I have previously indicated. In all cases the animals were kept under observation for two or three days before testing, and their temperature taken at least three or four times; in one case the temperature, which was very irregular (owing to recent parturition), was taken for eleven days in order to ascertain the range of variations on such cases. After the injection of tuberculin the temperature was taken, with few exceptions, four times between the ninth and twentieth hour, at intervals of three hours.

The animals which did not react were at once transferred to recently disinfected sheds. Those which reacted were speedily sent to the abattoir. Exception was made in the case of a group of ten young heifers, which were all slaughtered whether tuberculous or not, and which will be dealt with separately. The carcases of the slaughtered animals were examined carefully at the abattoirs by Mr. Holburn and the lesions found carefully recorded. In doubtful cases the organ or parts of organs were referred to me for further investigation. The price obtained for each carcase was also noted. Each animal previous to slaughter was valued by an independent expert.

All the calves were kept isolated from the first and fed on boiled milk. No attempt was made to separate the calves of tuberculous dams from the others, of which there were very few. The stables which had been occupied by tuberculous cattle were disinfected thoroughly with chlorinated lime solution and then whitewashed.

To replace the gaps made on the old stock, new stock was bought subject to the tuberculin test, the animals being kept in a separate shed previous to the application of the test. All animals found to react were returned to the seller, and only those which did not react were added to the old stock. This was done in order to ascertain the safety of relying on the tuberculin reaction as a basis for contract. (I may say at once that out of thirty-four heifers

and cows, specially selected as animals presumably healthy which it would be desirable to purchase, twenty-eight passed the first test.)

The milk of none of the tuberculous cows was again used on the farm without being boiled, although there was no evidence of tuberculosis of the udder in any case. Finally, owing to Mr. Ashton's change of residence, all his cattle were sold by auction and a record was kept of the prices obtained for each animal.

I have summarised the results of these experiments in Table I.,* from which, however, I have excluded all the animals which had been rejected after being tested previous to purchase.

The general results of these experiments may be stated shortly as follows:—

Of the fifty-eight head of cattle which were kept under observation, nine were young calves which had been born of non-tuberculous dams during the investigation; their age ranged between four and ten and a half months, none of them reacted to tuberculin, and a good price was obtained for them at the sale.

Of the other animals, forty-eight gave a definite reaction, either positive or negative, at the first test. One, a young heifer calf (No. 91), gave a doubtful reaction the first time. It had a rather high temperature (102·4°) three hours before testing, and its temperature rose to 104·2° on the seventeenth hour after the injection of tuberculin (a rise of 1·8° F.); on being subsequently tested five and a half months and sixteen and a half months afterwards the reaction was clearly negative.

Of the forty-eight animals which gave from the first a definite reaction:

Nineteen reacted positively and twenty-nine negatively.

All the cows which gave a positive reaction were found after being slaughtered to be distinctly tuberculous, some were very slightly diseased, several were in an advanced state of tuberculosis.

Of the twenty-nine which gave a negative reaction at the first test, one (No. 36), which had newly calved at the time of the first injection, reacted positively when tested a second time three months afterwards. This was the only failure among the negative tests.

Of the twenty-eight other cases, seven were slaughtered, and no evidence of tuberculosis could be found after a minute search. Twenty-one were retested a second time, and a third time in the course of sixteen to twenty months, the results of the second and third tests being the same as those of the first. Three of these cows were found free from tuberculosis after slaughter. In two cases a fourth test was applied with identical results.

This experiment gave the following percentages in connection with the forty-nine animals which were kept under observation a sufficient length of time:—

Definite reaction, forty-seven out of forty-eight—*i.e.*, nearly 98 per cent.

* At the end of this paper.

The doubtful reaction gave place to a definite reaction on the second trial, so that the failure was not a permanent one.

Positive reaction, nineteen out of nineteen proved to be correct—*i.e.*, 100 per cent.

Negative reaction, twenty-eight out of twenty-nine proved to be correct—*i.e.*, 96·5 per cent.

I have already explained the cause of this error, which was corrected within three months by retesting. I believe that a clinical method which gives such results may be considered as perfect as any method of diagnosis can ever be expected to be.

This experiment, which was conducted with an amount of care which possibly would be difficult to observe uniformly in ordinary practice, shows clearly that tuberculin applied to cattle not exceeding eight or nine years of age may give absolutely reliable indications at the first application of the test in 98 per cent. of the animals tested, and that by repeating the test after an interval of two or three months the margin of error may be reduced to nil by careful consideration of the state of the animal.

It may be objected to this experiment that it has been made on too small a scale, and that the precautions taken were in excess of what might be observed in ordinary practice. With regard to the number of animals I will admit at once that it was small; on the other hand, I think that it would have been difficult to obtain all the data I have collected had I dealt with a larger herd. The cost of such experiments is also considerable, and it seemed to me that a thorough experiment on a small scale was better than an extensive investigation giving incomplete data.

16. *Aberdeen University Department of Agriculture experiment.*—I am fortunately in a position to avail myself of the results of a later investigation bearing on a much larger number of animals examined under conditions such as may be easily observed in practice. I had opportunity to discuss with Professor Hamilton the conditions under which this set of experiments was carried out, and I am fully satisfied that as far as they go the results may be received as absolutely reliable. I feel, however, that owing to the facts that the temperature of the animals was taken only once before the test was applied, and only between the tenth and thirteenth hour after the injection, the value of tuberculin was tested somewhat more severely than necessary. It would be impossible to reproduce here the tables of results given in the Report of this experiment published in 1899 by the Department of Agriculture of the Aberdeen University. (*Report on an Investigation with regard to the Value of Tuberculin as a Test of the presence of Tuberculosis in Cattle, by J. McLauchlan Young, F.R.C.V.S., and J. S. Walker, M.B., D.P.H., Aberdeen University*, 1899.)

The authors explain in this report that by arrangement with important butchers and cattle-owners they were able to test a large number of cattle intended for slaughter, generally on the farm before removal; when this was impossible the test was applied in the byre connected with the slaughter-house after the animals had been kept there for twenty-four hours.

It will be obvious therefore that in the second group of cases the test was applied under conditions not altogether favourable to success.*

The main conclusions of the authors regarding the value of tuberculin are summed up as follows by themselves :—

"1. Our experience confirms the generally accepted opinion that tuberculin loses its virulency when kept for any length of time.

"2. When used with care and under proper conditions, tuberculin is a reliable diagnostic of tuberculosis in cattle, except (*a*) when the tubercular lesion is minute, or (*b*) when the disease has become generalised, especially in the case of aged and emaciated animals."

The authors sum up these results in four tables, giving a detailed account of the age of the animals tested, or the temperatures observed, and of the lesions found in the carcases after slaughter.

They sum up these tables as follows :—

1. Bullocks 2 years old, with one exception.	100 tested.	20 reacted and were found after slaughter to be tuberculous. 4 of the 80 which did not react were found to have tuberculous lesions. Total, 24 tuberculous.
2. Heifers all under 2 years, with one exception.	60 tested.	6 reacted, and were found after slaughter to be tuberculous. 4 of the 54 which did not react were found to have tuberculous lesions. Total, 10 tuberculous animals.
3. Cows, average age 7½ years.	77 tested.	25 reacted, and were found after slaughter to be tuberculous. 17 of the 52 which did not react were found to have tuberculous lesions. Total, 42 tuberculous animals.
4. Bulls 3 years of age.	3 tested.	1 reacted, and was found tuberculous after slaughter. 2 did not react and were found healthy. Total, 1 tuberculous animal.
Total number of animals tested	240 . . .	77 tuberculous animals, of which 52 gave a positive reaction during life.

These results resemble very closely those obtained by Schütz in 1891, and at first sight they are not very encouraging. Fortunately the authors have given sufficient details to make it possible to examine these figures critically. I have prepared on the basis of their own records two tables (Tables II. A and B) which, I think, throw some light on the subject.

We may safely exclude all the results which are based on experimental faults which are clearly admitted. On the other hand, we must retain those results which, though of doubtful value, may be accepted as necessary defects which would occur under ordinary circumstances. By rearranging the

* Thus in a few cases the temperature before testing was rather high, and in other cases recorded as negative the temperature was obviously still rising at the thirteenth hour.

TABLE IIA.—A GENERAL SUMMARY OF THE ABERDEEN EXPERIMENTS. Rearranged by the Author.)

—	Number tested.	Age.	Tuberculin reaction.		Tuberculosis found. Post-mortem.	Error in Tuberculin reaction.		Number of reference in Report.	Nature of Cases in which error was observed.
			−	+		+	−		
I. Heifers	60	1½ to 2 years	54	6	10	0%	6·6%	28	Bad tuberculin used.
								30	,, ,, ,,
								31	Syringe leaked, quantity injected unknown.
								60	Dose possibly too small. (60 is the only error not fully explained by experimental accidents—this reduces the percentage of failures to 1·6%.)
II. Bullocks	100	2 years	80	20	24	0%	5·0%	3	Only lesion a fibrous tubercle in lung.
								7	There was a rise of 1° F.; animal was not well; this is not a negative, but a very *doubtful reaction.*
								19	Minute calcareous tubercle in mesenteric glands; tubercle bacilli found, but process apparently becoming quiescent. (It is doubtful whether any of these cases is a complete failure; two cases may be accepted as such = 2·5% failure.)
III. Bulls	3	3 years	2	1	1	0%	0%		
IV. Cows	77	Average 7½ years	52	25	42	0%	32·6%	5, 6, 7, 19, 33	In all these cows there was a rise of temperature ranging between 1° and 2° F. They should have been considered doubtful.
								16	Was 8 years old.
								27, 33, 56, 60	Were 9 years old.
								34, 59, 61	Were 10 years old.
								7 and 62	Were 11 years old.
								6, 17, 20, 42 and 65	Were 12 years old.
								5 and 19	Were 13 years old.

table so as to give results according to the age of the animal tested, the following figures (Table IIB.) are obtained:—

TABLE IIB.—INFLUENCE OF AGE AND DISEASE ON THE TUBERCULIN REACTION.

——	Number of Animals.	Tuberculin reaction.			Tuberculosis. Post-mortem.	Total Tuberculous.	Error in − reaction.	Error in + reaction.
		−	+	%		%		
Heifers under 2 years .	57	51	6	10·5	7	12·25	1 = 1·75%	0
Bullocks 2 years . .	98	78	20	21·4	22	22·44	2 = 2 %	0
„ 3 years . .	3	2	1	33·3	1	33·33	0	0
Cows 4 years . . .	5	4	1	20·3	1	20·3	0	0
„ 5 „ . . .	9	5	4	44·4	4	44·44	0	0
„ 6 „ . . .	19	9	10	52·6	10	52·6	0	0
„ 7 „ . . .	10	4	6	60·0	6	60	0	0
„ 8 „ . . .	8	7	1	12·5	2	25	1 = 12·5%	0
Totals for all animals up to 8 years of age	209	160	49		53	25·4	4 = 1·91%	0
Cows 9 years . . .	6	5	1	16·6	5	83	4 = 66·4%	0
„ 10 „ . . .	6	5	1	16·6	4	66·4	3 = 49·8%	0
„ 11 „ . . .	4	3	1	25·0	3	75	2 = 50 %	0
„ 12 „ . . .	6	6	0	0	5	83	5 = 100 %	0
„ 13 „ . . .	3	3	0	0	2	66·6	2 = 100 %	0
Total for cows above 8 years of age . .	25	22	3		19	75	16 = 76 %	0
Animals excluded owing to age being unknown or experimental faults . .	6							

Diagram I. (at the end of this Paper) gives also a graphic representation of the same facts.

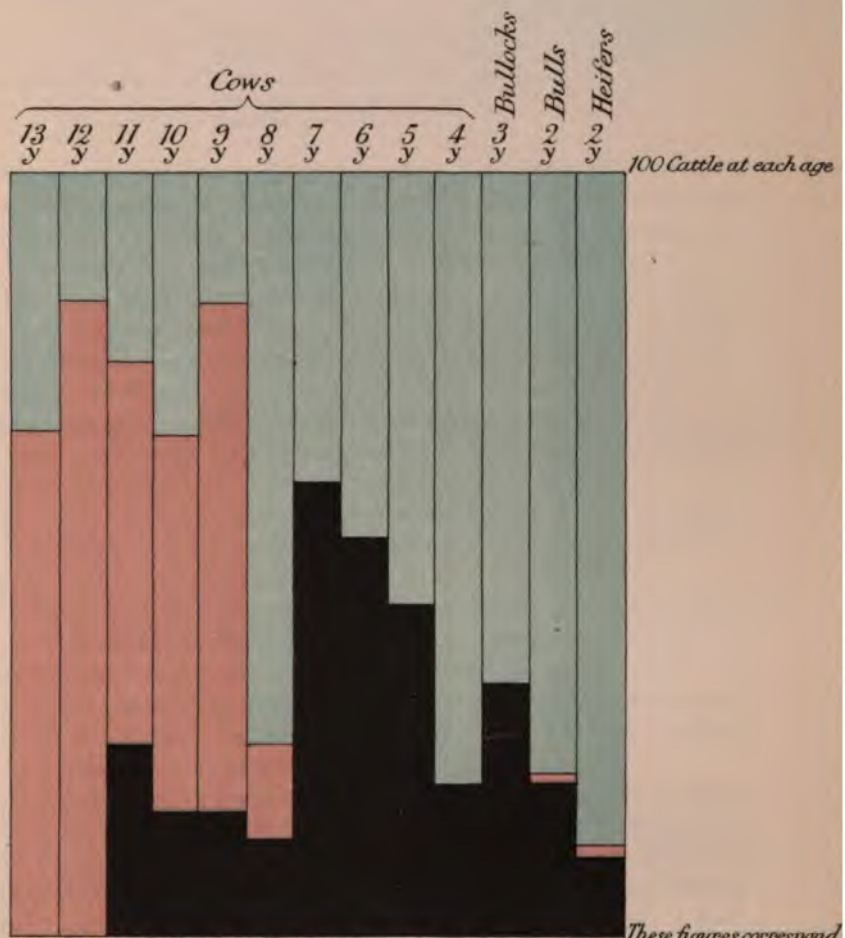
Even if the five cases which I have excluded on good grounds from the group of animals under eight years were retained in that group, the total number of errors would have been 9 out of 209 tests, an error equal to 4·3 per cent. I should state also that all the positive tests were found correct, and that no case for compensation could have arisen. Of the nine cases in which a negative reaction was misleading, seven were affected with extremely localised tuberculosis arrested or nearly arrested, and only two, heifer No. 60 and cow No. 16, were suffering from pulmonary tuberculosis and might have been a source of infection. In this group, therefore, the amount of serious and material error amounted to 2 out of 209, or less than 1 per cent.

With regard to the second group of aged cows, they were all in an

DIAGRAM I.

AUTHOR'S ANALYSIS OF THE RESULTS OBTAINED IN ABERDEEN.

Tuberculin reaction compared with results of P.M. Examinations.



	13 y	12 y	11 y	10 y	9 y	8 y	7 y	6 y	5 y	4 y	3 y	2 y	2 y
P.M. %	66	83	75	66	83	25	60	52	44	20	33	22	12
Tuberculin %	0	0	25	16	16	12	60	52	44	20	33	21	10
% of Animals tested. Total 234	3	6	4	6	6	8	10	19	9	5	3	98	57

These figures correspond respectively to the height of the Pink & of the Black columns.

Blue, — Non Tuberculous Cattle.
Pink, — Tuberculous Cattle discovered by Post Mortem examination.
Black, — Tuberculous Cattle recognised both by Post Mortem examination & Tuberculin test.

advanced state of tuberculosis, and their state would have easily been recognised by clinical examination.

I will show later on that under a proper system of inspection tuberculosis should never reach such a degree as to render tuberculin useless as a method of diagnosis. It may be interesting to note that experiments conducted in 1891 in the Duchy of Baden by Lydtin, according to the same plan as that adopted in Aberdeen, yielded the following results :—

110 head of cattle	*a* Negative tuberculin reaction, 20. Tuberculous lesions found (post-mortem) in none. *b* Positive tuberculin reaction, 39. Tuberculous lesions found (post-mortem) in 37. *c* Doubtful reaction, 1.

In this case the negative reactions were free from error. The errors in connection with the positive reactions were two in number, but as no precaution appears to have been taken to allow the animal to rest before the injection of tuberculin the results obtained were remarkably accurate.

The results of the three experiments which I have discussed, and which bear upon a total of 408 animals, leave, I think, no room for doubt as to the efficiency of tuberculin as a diagnostic agent, when it is properly used. The amount of error attributable to failure of the test is very small; indeed, it is trifling when compared to the errors which are inherent to most methods of diagnosis, many of which are nevertheless used as a basis for successful administrative procedure.

To the direct evidence which I have already given I may add some indirect evidence which I have collected in the course of my investigations on cow's milk as a source of infection.

17. *Results of inoculation with the milk of cows which had reacted or had not reacted to tuberculin.*—In the course of six years nearly 2,000 samples of milk have been examined in my laboratory; of these samples over 500 were from single cows. Most of these samples were sent to me by the Manchester, not a few by the Salford, and a smaller number still by other sanitary authorities. Some I have collected myself.

I am greatly indebted to the Manchester Sanitary Committee, and specially to Dr. Niven, for the facilities which have been given to me for getting access to the information I wished to obtain, and to the Chief Veterinary Inspector, Mr. Holburn, and the Veterinary Inspector attached to the Sanitary Department, Mr. Lloyd, for supplying me with all the material I required. I have also to acknowledge similar help received from Dr. Tattersall, the Medical Officer of Health for Salford, and his Veterinary Inspector, Mr. Fordham.

The following table records some of the data I have thus obtained. The smallness of the numbers is undoubtedly disappointing, considering the amount of trouble taken, but the absence of any discordant results renders those figures, small as they are, very significant. Most of the 505 cows, the milk of which was examined separately, had suspicious udders. A reliable record of the effects of the tuberculin test was obtained in fifty cases only.

The following table shows the effects of inoculation of guinea-pigs with the milk of these fifty cows.

INFORMATION COLLECTED IN CONNECTION WITH THE EXAMINATION OF MILK FROM SINGLE COWS WITH DISEASED UDDERS, SINCE 1896.

Year.	Total number of cows examined.	Total number in which a record of tuberculin test was obtainable.	Number of cows giving a positive reaction.	Number of cows giving a positive reaction, and the milk of which was tuberculous.	Number of cows giving a negative reaction.	Number of cows giving a negative reaction, and the milk of which was tuberculous.	Doubtful reaction.	Milk tuberculous.
1896–97	30	15	12	5	3	0		
1898	4	0	—	—	—	—		
1899	173	14	12	1	2	0	2	0
1900	208	19	12	2	5	0		
1901	90	2	0	0	0	0		
Total .	505	50	38	8	10	0	2	0

This evidence shows that none of the cows giving a negative reaction with tuberculin yielded tuberculous milk. On the other hand, all those cows which yielded tuberculous milk gave a positive reaction. This table shows also that out of 505 cows, nearly all with suspected udders, very little more than 10 per cent. had been tested with tuberculin (I say a little more than 10 per cent., for it is probable that some may have been tested without our obtaining evidence of it; it must also be remembered that I have excluded all cases in which the records did not appear to be reliable). The use of the tuberculin test is, therefore, not very prevalent yet.

SECOND PART.

A. *Administration and Finance.*

Methods which have been recommended for the prevention of tuberculosis in cattle.—When one reviews the various methods which have been recommended, and sometimes carried into execution, for the purpose of checking the progress of tuberculosis, one is struck with the fact that most of the measures recommended had for chief object the protection of the consumer of products liable to tuberculous infection—chiefly meat and milk. These measures provide the means of controlling to a certain extent cattle which have become tuberculous, but *they do not make*, in my opinion, *any adequate provision for the eradication of existing tuberculosis or the prevention of the spread of the disease.* I will not attempt to review the work which has been done in all countries, a few typical examples will be sufficient.

In France an attempt was made early to deal with this question.

18. *French legislation*, 1888.—The "Décret du 28 Juillet, 1888," adds

tuberculosis to the list of contagious diseases to which the "Loi du 21 Juillet, 1881," is applicable. This law provides for notification, isolation, prohibition of sale, etc., and is applicable to all animals actually diseased or suspected of being diseased, contravention being liable to penalties. To this the "Arrêté Ministériel du 28 Juillet, 1888," adds the following articles:—

Art. 9. When bovine animals are found to be tuberculous, a notice is given by the prefect to place the animals under the supervision of the veterinary inspector.

Art. 10. Any animal proved to be tuberculous is isolated and sequestered. The animal can be removed only to be slaughtered. The slaughter is carried out under the supervision of the veterinary inspector, who has to report upon it to the prefect within five days.

Art. 11. The flesh of tuberculous animals is not allowed to be sold for consumption (when tuberculosis affects certain organs or groups of organs which are indicated). Neither the flesh nor the viscera can be used for the feeding of animals—they must be destroyed.

Art. 12. The skin can be used only after disinfection. The sale and the use of milk from tuberculous cows are forbidden.

This milk, however, may be used, after being boiled, for the feeding of animals.

It is obvious that these regulations, wise as they are, do not provide means of preventing the spread of tuberculosis among cattle; they are more suggestive than practical. It must be remembered that they were devised before the discovery of tuberculin, and that the authorities depended on clinical examination for the diagnosis of tuberculosis.

19. *Massachusetts experiments*, 1894 *and* 1897.—In 1894 very stringent measures were adopted in the State of Massachusetts. The cattle were inspected every six months, the animals *suspected on clinical grounds* were isolated, tested with tuberculin, slaughtered if tuberculous, one-half of their value was given as compensation to the owner. This method was obviously defective, for most of the tuberculous cattle escape detection on clinical examination. An attempt was, therefore, made to test with tuberculin all the cattle of three different districts, into which no fresh cattle were allowed to enter which had not previously passed the tuberculin test. This experiment proved too costly, and owing probably to incompleteness and imperfect disinfection of premises, it resulted in little more than a considerable reduction in the number of cases of advanced tuberculosis. In 1897 the State confined itself to encouraging by means of compensation the application of the tuberculin test under the supervision of State veterinary inspectors, the removal of diseased cattle, and the thorough disinfection of infected stables.

20. *Belgian legislation*, 1895.—In 1895 the Belgian Government attempted to enforce very thorough measures, based in great part on a project of legislation supported previously in France by Nocard. This was found impracticable on account of the cost of compensation, and in 1897 less rigorous measures were adopted. These may be summarised as follows:—

1st. All animals reacting to tuberculin are considered tuberculous.

2nd. Animals proved or suspected to be tuberculous cannot be sold except to the butcher. 3rd. Premises which have been occupied by tuberculous animals must be disinfected. 4th. Veterinary inspectors must report every case of tuberculosis, recognised as such, after slaughter and inspection. 5th. They must report also any case which they suspect of being affected with tuberculosis. 6th. The owner of a tuberculous carcase must declare its origin, and whether his cattle is intended for the meat market—if it is not. 7th. His cattle is inspected on behalf and at the cost of the Government. 8th. All animals which, *on clinical examination* are recognised to be tuberculous, are slaughtered within eight days, compensation equal to from 25 to 70 per cent. of the value being given to the owner. 9th. Suspected animals are kept isolated *unless the owner consents to the application of the tuberculin test*, in which case he must have all reacting animals slaughtered.

The owners of cattle are encouraged to take the initiative in the carrying out of these preventive measures by utilising the tuberculin test, provided they undertake to have all the reacting animals sold for slaughter without delay, or to isolate those animals which do not exhibit any clinical signs of tuberculosis. There are other important provisions regarding isolated animals, which cannot be given here from want of space. I have said enough, however, to show that the Belgian law relies still to a considerable extent on the clinical examination of cattle, and *offers the tuberculin test as an alternative.* Under such conditions it is obvious that a considerable number of tuberculous animals must escape detection. This is not my own opinion only, for Mr. T. H. Elliott (Secretary to the Board of Agriculture), who is in a position to obtain reliable information, has stated positively that *skilled veterinary surgeons would not be likely to condemn from mere clinical examination even* 10 *per cent. of the tuberculous animals* in this country. (Report of the Royal Commission on Tuberculosis, 1898, Minutes of Evidence, 9, 179, p. 12.)

21. *Danish legislation*, 1893 *and* 1896.—In 1893, Bang was instrumental in bringing about the promulgation of a law against tuberculosis. This law had for its object to provide assistance to owners of cattle, and to place them in a position to combat tuberculosis without any heavy burden being thrown upon the State, which supplied only veterinary inspection and tuberculin. The owners had to isolate the animals which had reacted from those which had not reacted. Healthy animals were lodged in thoroughly disinfected stables, and special precautions were taken to prevent accidental infection through the attendants. The cattle were to be retested annually or bi-annually, and any fresh case of tuberculosis isolated.

The calves of tuberculous dams were to be removed from infected places, and fed from the second day on boiled milk or milk from a healthy cow.

Animals showing clinical signs of tuberculosis were not compulsorily slaughtered, but were kept with other tuberculous animals; they could only be sold for meat and slaughtered under veterinary control.

Animals which had reacted to tuberculin, but did not show clinical signs of tuberculosis, could be disposed of without any restriction.

Some of the most obvious defects of these regulations were corrected by

the law of 26th of March, 1896, which provides for the immediate slaughter of all cows affected with mammary tuberculosis, the owner receiving as compensation from one-fourth to one-half of the value of the carcase.

The same law sanctions the subvention of owners who wish to have their cattle tested, provided that they have the means of isolating the infected animals.

Imported cattle are submitted to the tuberculin test, animals reacting being slaughtered under veterinary supervision. The milk and buttermilk, whether from home farms or imported, and used for the feeding of animals, must be submitted to a temperature of 85° C. before being used.

These Danish measures can, therefore, be effective only as a result of private initiative, which is encouraged and supported by the Government. Even if all the owners of cattle in the country followed the advice and accepted the help given to them, it is obvious that nothing more could be expected from the measures recommended *than the keeping of tuberculosis within certain limits* by the removal of cattle in an advanced state of tuberculosis. With regard to the heating of milk to 85° C., I regret to say that, as I will show later, my own experience has led me to doubt its efficiency. I think that the experience gained by Professor Bang since 1893 has led him of late to favour more thorough methods, if I understand aright his very able communication at the 1898 Paris Congress on Tuberculosis (Semaine Médicale, 1898, p. 329), of which I have freely availed myself in this review of preventive measures.

22. *English measures.*—I have not alluded to English preventive measures because, up to now, they have been chiefly directed against the sale of tuberculous meat and milk. It is true that local measures have been enforced with the object of improving the sanitation of cowsheds and of making compulsory the inspection of all milch cows supplying milk to large towns, such as Manchester, Liverpool, Sheffield, Glasgow and others. Specially good work has been carried out in Manchester by Dr. Niven, who has succeeded in causing the removal of many cows in an advanced state of tuberculosis, and has in this way reduced the sources of infection. Such local measures are, however, in my opinion, only suitable to protect the consumers in the towns concerned, and do not affect materially the general problem except in so far as they serve as object-lessons. In fact I have reasons to believe that efficient localised supervision tends to cause a migration of tuberculous cattle into districts which are not supervised. With regard to the improvement of cowsheds, important as this object is, I hold that *so long as cowsheds, good or bad, are allowed to be occupied by cattle in various stages of tuberculosis, much of the money spent on sanitation is wasted.* I have had opportunity to estimate the amount of tuberculosis present both in unsatisfactory and very perfect cowsheds, and I have found that sanitation of the cowshed is insufficient to prevent the spread of tuberculosis among cattle so long as tuberculous animals are allowed to cohabit with non-tuberculous animals.

23. *Causes of previous failure of legislation.*—I think that the chief causes of the failure of measures which have been adopted so far in various countries have been the following:—

1st. Nowhere has the use of a *sufficiently accurate method of diagnosis* been made the basis of the measures adopted. Tuberculin has been recommended, but option in favour of clinical methods has almost invariably been allowed. This, as I have shown, has for effect to allow a large number (probably from 80 to 90 per cent.) of tuberculous animals to remain undetected. On the other hand, if the use of tuberculin had been made compulsory as a basis of action, not more than 2 or 3 per cent. would have escaped for a time, and would in great part have ultimately been discovered on retesting.

2nd. With the exception of the short, and necessarily incomplete, trials which have been made by the State of Massachusetts and the Belgian Government, *these have been partial and not general*, so that what good was obtained in one farm or district has been counteracted by the absence of precautions in a neighbouring farm or district.

3rd. When *slaughter of tuberculous animals* has been resorted to, this has generally been done without discrimination, and the necessary *compensation has become so costly as to be prohibitive.*

These have, in my opinion, been the chief causes of failure, and I have, therefore, attempted to find if it would not be possible to discover some solution to these difficulties.

B. *Experimental Stamping Out of Tuberculosis in a Small Herd.*

24. *Stamping out of tuberculosis at Ford Bank by the use of tuberculin.*— I have shown by the Ford Bank experiment how by a careful application of the tuberculin test, disinfection of premises, and thorough isolation, it is possible in the short space of one year to replace entirely a highly tuberculous stock by stock free from tuberculosis and remaining on the original premises. This stock remained entirely free from tuberculosis for a second year. To make this clear I may sum up the results indicated in Table I. in the following way:—

May, 1898. Old stock	12 milch cows and heifers*	11	tuberculous.	
	3 bullocks	2	,,	
	6 calves	0	,,	
	21	13	,,	61·88%
February, 1900. New stock including old stock which had not previously reacted.	20 milch cows and heifers*	0	tuberculous.	
	1 bullock	0	,,	
	9 calves born since the beginning of the experiment	0	,,	
	30	0	,,	0%

(I have already explained that this experiment has not been continued up to the present date, owing to Mr. Ashton's change of residence and the sale of all his cattle.)

* The average age of these 20 cows and heifers was greater than that of the 12 cows in the old stock.

25. *The buying of cattle subject to the Tuberculin Test at Ford Bank.*—In my experiments it has been impossible to test the effects of general measures except by the rigid exclusion from the estate of new cattle which had not passed the tuberculin test; this was done by making a negative tuberculin reaction a *sine quâ non* condition to the introduction of any fresh cattle.

Twenty-four cows or heifers, apparently healthy and specially selected, were offered to Mr. Ashton's steward under these conditions. These were all isolated and tested, with the following results :—

11 cows 5 years of age or more	6 reacted.
13 cows or heifers 2 to 3 years of age . . .	1 reacted.
24	7

Seven animals were therefore returned to the seller. The seventeen cows or heifers which did not react to the test were admitted to the herd. One of these, a fine cow and good milker, had newly calved when the first test was applied; it was tested again three months after, and being found to react was resold to the original owner. The remaining sixteen cows were tested twice during the following twenty months, and continued to give a negative reaction and to be in extremely good condition. Mr. Jones, who was in charge of the cattle, and, as I have previously explained, assisted me in the carrying out of the experiment, wrote to me on the 10th of March, 1900 : "The last test was very interesting, as showing the possibility of stamping out tuberculosis, and I think Mr. Ashton is losing much by disposing of such valuable stock. The auctioneer was much struck with their appearance, and hopes to have an exceptional sale, but I am afraid the milch cows will be sold at a sacrifice, while the young stock may sell very well indeed." Mr. Jones' previsions, which were based on a knowledge of the local conditions which would influence the sale, were entirely justified, and it is much to be regretted that the sale was conducted under conditions which deprived us of the means of estimating the full value of the stock which a sale under ordinary conditions would have given us. The prices obtained will be found in Table I.

26. *The cost of stamping out Tuberculosis at Ford Bank.*—This leads me to a consideration of *the financial aspect* of the question. This, which from a scientific point of view is not the most important, is probably from the practical and administrative sides the chief difficulty which has to be overcome before satisfactory preventive measures can be put in force. The Ford Bank experiment was, therefore, conducted in such a way as to yield as much information as possible on this point.

I must, however, point out that, however much a man in Mr. Ashton's position tries to have his farms placed on a thoroughly practical business basis, it is impossible for him to have the work conducted as it would be by an experienced practical farmer working for himself. It is true that Mr. Ashton was fortunate in having a man of Mr. Jones' experience (who is now bailiff to the Rochdale Guardians) in charge of his cattle and dairy. Unfor-

tunately most of the business transactions were conducted by Mr. Ashton's steward, who had much less experience of cattle.

Then Mr. Ashton, in his desire to have no tuberculous cattle in his pleasure-grounds, preferred to have all those found tuberculous slaughtered without delay. This made the experiment more crucial but more costly, for many of the milch cows were not in a fit state to be sent to the butcher.

Finally, in disposing of his cattle by auction, Mr. Ashton did not study the means of obtaining the best value for his stock.

The Ashton experiments must be considered as indicating the maximum cost of preventive measures; this, however, does not in the least diminish their value.

(*a.*) *Removal of old diseased stock.*—In May, 1898, the approximate value* of the old stock, which consisted chiefly of well-bred Yorkshire shorthorns (not pedigree cattle), was—

	£	s.	d.
7 milch cows at £19	133	0	0
2 new milch cows at £22 10*s.*	45	0	0
3 heifers at £14	42	0	0
3 young bullocks at £8	24	0	0
3 heifer calves (six months) at £4	12	0	0
3 young calves at £2	6	0	0
21	£262	0	0

Thirteen of these gave a positive reaction at the first testing with tuberculin, and were slaughtered at once, viz., eight cows, three heifers, and two bullocks, which were all found *post mortem* to be tuberculous. Except in one case, all the viscera had to be condemned; in addition to this, one whole carcase was condemned on account of generalised tuberculosis, and the half of another was also found unfit for food.

	£	s.	d.
The sum realised for the carcases was	159	4	8
The value of the remaining stock was—			
1 cow	22	10	0
1 bullock	8	0	0
6 calves	18	0	0
	£207	14	8
The actual loss was therefore	54	5	4
To which must be added the veterinary charges	10	0	0
	£64	5	4

There was also a serious loss on dairy produce, which was due to the immediate slaughter, and which would not have occurred to the same extent had arrangements been made to slaughter the diseased cows only at a time when they were in a proper condition, and when it was possible to replace

* The cattle were in these experiments valued by an independent expert, the weight of whose opinion is generally recognised in the district.

them rapidly. (The milk of diseased cows should, of course, be always sterilised before use.)

It will also be evident that if the herd had been submitted to periodical inspection every six months, and animals reacting separated and fattened at once, they could have been gradually replaced without interference with dairy work, and sold to the butcher at a much lower loss, since no animal would have been in such a state of tuberculosis as to necessitate the condemnation of anything more than some viscera.

Finally, had the testing been done as a part of a general system of inspection the cost of it would have been considerably reduced.

On all these grounds I think I may safely state that the actual loss of £64 5*s.* 4*d.* is much greater than it might have been.

It will also be noticed that the proportion of milch cows affected was greater than the average, eight out of nine cows being found tuberculous (88 per cent.).*

The first tuberculin testing was carried out by Mr. Locke, Mr. King, and Mr. Holburn; then all the diseased animals were slaughtered at the Manchester Abattoir, inspected by Mr. King and Mr. Holburn, and portions of organs sent to me for examination. The experiment was therefore carried out with sufficient care and publicity to make the results absolutely reliable.

(*b.*) *Buying of new stock free from tuberculosis.*—The next step taken was to replace the diseased stock. The shippons having been thoroughly cleansed and disinfected, new stock was bought subject to the tuberculin test. That is to say, the cows were kept at Ford Bank for about a fortnight, during which they were tested, and only those not reacting kept. A fee of £3 was paid to the seller as a general consideration for the trouble caused by this arrangement. But I think he found further compensation in the prices he charged for the cattle sold under these special conditions.

27. *Loss caused by the slaughter of tuberculous cattle at the Cheshire County Council Farms.*—The experiment carried out by the Cheshire County Council may be compared with advantage with the Ford Bank experiment.

This important experiment was conducted on very much the same lines as the Ford Bank experiment, but about one year later. A general account of

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* This is easily accounted for by infection from cow to cow. In 1893, a cow A, apparently very excellent, was placed in one of the shippons; this cow died of generalised tuberculosis in 1896. The cow B, occupying the adjoining stall, became tuberculous also, and died of generalised tuberculosis in 1897. A cow occupying the stall next to cow C then became tuberculous, and was slaughtered in 1897, when only three and a half years old, and many of the thoracic and abdominal glands, besides the lungs, were found tuberculous. Cow D stood two stalls from cow A; cow 2, in list of Ford Bank old stock (see Table I.), stood in stall next to D; cow 1 was in the same stall with No. 2, etc. All these cows became tuberculous. It is, of course, evident that, in the absence of any previous investigation, it is impossible to affirm that cow A was the only source of infection.

It is worth noticing that five out of the six calves which were found non-tuberculous were born of tuberculous dams.

The amount of air allowed for each animal varied from over 600 to 1,000 cubic feet, and the cattle were kept apparently under perfect sanitary conditions.

the work done up to the beginning of March, 1899, has been published in the *Manchester Guardian* (March 23rd, 1899) and several other newspapers.* I cannot do better than to quote *verbatim* part of the account given in the *Guardian*:—

"The herds at the Dairy Institute, Worleston, and at the Agricultural School, Holme Chapel, were tested with tuberculin, with the following results: In the Worleston herd, numbering fifty-four, thirty-seven were found to be healthy, fourteen reacted to the test, and hence were classed as tuberculous, and three were classified as doubtful. In the Holmes Chapel herd of seventeen, thirteen were found to be healthy, three tuberculous, and one doubtful. Of those classified as doubtful one had just calved, two were about to do so, and the other had a high temperature before injection; hence it was not considered that a reliable conclusion could be come to in these cases. In each herd there was a valuable shorthorn pedigree bull, both of which reacted. The next step was to prove the reliability of the test by slaughtering those which had reacted, and having a careful and thorough post-mortem examination of the bodies made by reliable men. It was, however, deemed advisable to retain a few of those which were considered tuberculous for further experiments. Accordingly, arrangements were made for ten animals —including the two bulls—to be taken to the abattoirs in this city and there slaughtered, and the bodies examined by Mr. King, chief veterinary inspector for Manchester; Mr. Storrar, chief veterinary inspector for the city and county of Chester; and Mr. Laithwood, chief veterinary inspector for Cheshire County Council. Arrangements were further made with Professor Delépine, of Owens College, that, should any difficulty arise in detecting tuberculosis in any of the carcases, he should be called in to make a microscopic and physiological examination, so that no doubt might remain. Again, in order to test whether or not the milk of the cows that had reacted was tainted with tuberculosis, a sample from each cow giving milk was sent in a special sterilised bottle to Professor Delépine, to be analysed bacteriologically and physiologically. Mr. Laithwood examined the udders of all the cows that had reacted at the Dairy Institute, Worleston, and found only one with an indurated udder; the remainder, so far as could be ascertained by manual manipulation, being entirely free. The slaughter of the animals and the post-mortem examination took place in Manchester on the 8th instant, in the presence of three members of the Cheshire County Council and of the organising secretary. Of the eight cows sent, two were in full milk, having but recently calved, and were low in flesh; one had an indurated udder, one was a little over two months off calving, was a heavy milker, and a lean, shelly cow. One cow was fat and ready for sale, and another in very good condition. Hence they represented all classes, and consequently the loss on them may be taken as approximating, if not exceeding, the average of what would ensue by sacrificing animals at once under such conditions.

* See also report on the experiments in regard to the testing of cattle for tuberculosis, Cheshire County Council. Wilmot Eardley, printer, Crewe.

"The veterinary inspectors found every animal more or less affected with tuberculosis, and have since made a detailed report of each. The disease was chiefly found in the glands, lungs, and liver, and in the majority of cases the inspector certified that the 'carcases were otherwise very good.' The examination is regarded as strong evidence of the reliability of the test. The examination, of course, was most complete, being carefully done by experienced men, who not only knew what they were looking for, but exactly where to look. All the carcases were declared suitable for human food, and they were placed in the hands of a salesman, who disposed of them at prices varying from £22 1*s.* 8*d.* to £4 14*s.* 1*d.* (less expenses). All the cattle had been carefully valued before being sent away, such valuation being their worth to the farmer as milking cattle or dairy stock. The total value of the nine animals was £149 18*s.* 6*d.* Their sale produced £97 7*s.*, showing a total loss of £52 11*s.* 6*d.* The main loss was in the cows which had recently calved. Being heavy milkers, they were low in flesh. Hence, though high in value as dairy cows, they were of low value for selling as meat. The remaining cows that reacted to the test had been isolated from the rest of the herd, and further experiments will be conducted to ascertain if tuberculosis can be cured. The experiments already carried out show that the disease is not hereditary."

It will be noticed that the loss on the diseased stock was greater in the Cheshire County than in the Ford Bank experiment, otherwise the results obtained are very much the same. In both cases the greatest loss was due to the immediate slaughter of milch cows, and especially of those which had recently calved, a procedure which I have already deprecated more than once.

A general consideration of the results obtained at Ford Bank, Worleston, and Holmes Chapel leaves no doubt as to the value of tuberculin as a diagnostic agent—that is to say, as far as the positive reactions are concerned. This is a matter of great importance from an administrative point of view, for tuberculin could hardly be employed for administrative purposes if it were found that many non-tuberculous cows gave a reaction similar to that given by tuberculous cows. With regard to the value of the negative reactions I have shown in the first part of this communication that by proper attention to certain conditions they are also quite reliable.

It is also evident that the immediate loss caused by indiscriminate slaughter of all tuberculous animals is very considerable. There was a loss of £52 11*s.* 6*d.* on the nine tuberculous animals from Worleston; that is a little more than £5 16*s.* per head.* At Ford Bank the loss on the thirteen animals slaughtered was £64 5*s.* 9*d.*, *i.e.*, a little under £5 (veterinary charges

* A later estimate based on the losses caused by the slaughter of nineteen tuberculous animals brought the loss up to £7 7*s.* per head. This would bring the average loss on the two experiments up to £6 3*s.* per head. In this later estimate, however, some valuable breeding stock was included. I think this class of stock should always be considered separately.

included). On the twenty-two animals from both places the average loss was nearly £5 7s. per head.

The number of cows and other cattle above two years of age in the county of Cheshire alone was, according to the Returns of the Board of Agriculture, 115,193 in 1897. Admitting that about 20 per cent. of these cattle were affected by the disease, this would give, roughly speaking, some 23,000 tuberculous animals, and if all these had been dealt with as they have been at Ford Bank and Worleston, the total immediate loss would not have been less than £123,000. It is not possible to make a similar calculation for the whole of the United Kingdom, for we have evidence which tends to show that the disease is too unequally distributed to allow of this being done, but still the loss would probably be about fifty-five times greater, *i.e.*, about £6,765,000. In this calculation I have excluded cattle under two years. My reason for doing so is that on an average the slaughter of young tuberculous cattle is not usually a serious source of loss. *In fact, it is not till the calving period has been reached that the losses begin to be serious.* The cows which have recently calved, and specially the heavy milkers, have a small value as meat compared to their value as dairy stock, so that the loss on these cattle is absolutely and relatively very heavy. I have already pointed out the desirability of not slaughtering milch cows till their milking period is over (communication which I made early in 1899 to the Cumberland and Westmoreland Chamber of Agriculture), and the results of the Cheshire County Council experiment have entirely confirmed this view.

C. *Influence of Age on the Losses caused by Tuberculosis.*

28. *Losses caused by the slaughter of tuberculous cattle of various ages.*—In order to obtain information on this point I divided all cattle into five groups:

1. Five years and over.
2. Three years and up to five exclusive.
3. Two years and up to three.
4. One year and up to two.
5. Under one year.

Then I found for each group the number of tuberculous animals, their estimated value, under ordinary circumstances, as dairy stock, and their value as meat after they had been slaughtered on account of tuberculosis and thoroughly inspected at a public abattoir by competent veterinary inspectors.* I have summarised my results in two small tables.

The outcome of this inquiry has been tabulated in Table III.† (see also

* Information regarding the age of cows, which cannot be found in the Cheshire County Council Report, I have obtained through the courtesy of Mr. R. P. Ward, the organising secretary to the Technical Instruction Committee.

† At the end of this paper.

detailed account: "Prevention of Tuberculosis in Cattle," *The Veterinarian*, July and August, 1899, Appendix II.).

It will be noticed that the Ford Bank farm represents one of which tuberculosis had taken such a firm hold that only one cow out of nine above three years of age had escaped. This may, therefore, be considered as an instance of the worst effects of tuberculous infection in a farm otherwise in perfect condition, but where no special precautions had been taken against tuberculous infection.

On the other hand, Worleston and Holmes Chapel farms may be taken as types of places where the utmost of what can be done by ordinary sanitation and selection of cattle to prevent the development of tuberculosis (short of using the tuberculin test and isolating the tuberculous animals) had been carried out.

These two kinds of farms are therefore representative as far as the prevalence of the disease is concerned, but with regard to the value of the stock, especially after slaughter, they are probably both above the average.

Group I.—Cows Five Years and Over.

At Ford Bank all cows in Group I. reacted; their average value per head was about £19 before the test; they realised £11 13*s.* as meat, there being a loss of about £7 7*s.* per head.

As 100 per cent. of the cows in this group were affected, the loss on the capital of £1,900 necessary to buy 100 such cows may be estimated at £735, *i.e.*, about 38 per cent. of the capital invested.

In the corresponding group at the Cheshire County Council farms, the loss on £1,515, representing the estimated value of 100 cows under the same conditions, would have been £189—that is, 12·47 per cent. This smaller loss is due to the fact that only 31·25 per cent. of the cows were tuberculous; the loss on each cow was about 40 per cent. at Worleston, and a little over 38 per cent. at Ford Bank.

Group II.—Cows Three Years and up to Five Exclusive.

In this group the number of cows affected was very large at Ford Bank—75 per cent. The loss on each animal was £8 6*s.*

The value of 100 such cows would be about £2,015, the loss on capital £622, or 30·86 per cent.

On the County Council farms 20·69 per cent. of the cows were affected; the loss on each animal was £11 12*s.* The value of 100 of these cows would have been, according to estimates, £1,800; the loss on capital £240, or 13·33 per cent.

In these first two groups the loss of dairy produce was considerable, and has not been taken account of in the above estimates.

Group III.—Heifers Two Years and up to Three Years Exclusive.

In this group, only three heifers were tested at Ford Bank, and these happened to be all tuberculous; this was certainly an exceptional accident.* The animals, however, being in good condition and the disease not advanced, the carcases sold for a price higher than the value estimated during life. So that, instead of there being a loss, there was an *apparent* slight gain on the capital represented by these three heifers. The estimated value of 100 such heifers would be £1,400, the surplus value being £15.

At Holmes Chapel none of the heifers reacted, so that there there is no loss to record.

Group IV.—Heifers One Year and up to Two Years Exclusive.

Out of five of these tested at Ford Bank none reacted.

Only one was tested at Holmes Chapel, and did not react.

Group V.—Calves under One Year.

None of these reacted.

I have not included THE MALE ANIMALS in this summary, because two of them were valuable bulls and could not be compared with ordinary dairy stock.

In Group II. (three to five years) there was at Worleston a well-bred bull estimated at £27, and which realised £22 1*s*. after slaughter—a loss of £4 19*s*., that is, less than half the loss on cows of the same age, although the estimated value of the cows was much lower than that of the bull before slaughter.

In Group III. (two to three years) a pure-bred shorthorn bull, valued at £35, reacted, and after slaughter realised £25 12*s*. But the loss on such an animal cannot be compared with that on ordinary stock.

In Group IV. (one to two years).

At Ford Bank there were one young bull and three steers, valued at £8 each. Two of them reacted. One was in such an advanced state of tuberculosis that the carcase was condemned and was entirely lost; the other realised £9 19*s*. These numbers are too small to allow one to calculate anything from them. The excessive value obtained for one and the complete loss of the other may be considered as quite exceptional.

The number of male animals included in the experiments is so small that nothing can be concluded from the results obtained, but they leave one with the impression that bulls and bullocks are not less affected by tuberculosis in this district than the cows and heifers.

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* I have shown (Table IIB.) that not more than from 20 to 33 per cent. of animals under four years of age might be expected to be tuberculous.

DIAGRAM II.

INCIDENCE OF TUBERCULOSIS AT VARIOUS AGES IN 2 SMALL HERDS OF CATTLE. (120 ANIMALS)

Tuberculin reaction positive = Pink (all confirmed by P.M. Examination)
negative = Blue
Loss % of Capital invested, caused by slaughter, indicated by a Green tint (valuable cattle excluded)

The Aberdeen experiment supports the view that bullocks are rather more liable to tuberculosis than heifers of the same age. (See Table IIA.)

Owing to the marked differences between the returns from Ford Bank and the other two farms, they may with advantage be summed up separately.

This has been done in the following Table and in Diagram II. (at the end of this Paper).

FORD BANK.

—	Percentage of cows and heifers tuberculous.	Estimated value of 100 animals before testing.	Loss on 100 such animals after slaughter of tuberculous ones.	Percentage loss on capital.
	Per cent.	£	£	Per cent.
Group I.	100	1,900	735	38
Group II.	75	2,015	622	30·86
Group III.	100	1,400	..	..
Group IV.	..	800	..	..
Group V.	..	320	..	..
WORLESTON AND HOLMES CHAPEL.				
	Per cent.	£	£	Per cent.
Group I.	31·25	1,515	189	12·47
Group II.	20·69	1,800	240	13·33
Group III.	..	1,300	..	..
Group IV.	..	800	..	..

(Valuable stock are not included in these Tables.)

It is evident from these figures that both experiments prove the same thing, viz., that if herds are to be kept free from tuberculosis by a method which will not cause unnecessary pecuniary loss, this must be done *by removing all animals which have become tuberculous before they have reached their third year.* Before that date the slaughter of tuberculous animals does not involve any serious actual loss to the farmer; at a later period the loss becomes very serious, more especially in connection with cows between the third and fifth year, when they have reached their greatest value as milkers. With regard to bullocks the problem is simpler, but it is equally evident that all tuberculous animals should be isolated before they are two or three years of age, and then slaughtered as soon as they can profitably be sold to the butcher.

If all the tuberculous stock over three years were eliminated from our herds, it would be quite easy for the farmer, assisted by competent veterinary inspectors, to keep his stock ever after practically free from tuberculosis, without any serious expenditure to himself.

D. *Practical Experiment to test the relative Meat Value of Tuberculous and Non-Tuberculous Animals under Two Years of Age.*

29. *Ford Bank Experiment* (2).—In order to test whether the foregoing conclusions were correct, Mr. Gair Ashton generously consented to bear the cost of a new experiment. This I will call the *second Ford Bank experiment.*

Ten barren heifers not over two years of age were to be bought by the steward at a fair or from a cattle dealer. They were to be selected in the usual way on the basis of their external appearance and estimated value, and not subject to the tuberculin test. After a few days' rest they were to be tested. The animals reacting entirely separated from those non-reacting. This young stock was then to be fattened, and when ready for the butcher, their value as live stock was to be estimated by an expert. The animals were then to be tested again and slaughtered at the Manchester Abattoir, their carcases thoroughly inspected by Mr. Holburn, the Chief Veterinary Inspector, who kindly had undertaken to report upon them. The carcases were then to be offered for sale at the public meat market. Mr. Jones was to keep a complete account of the cost of agistment, special feeding and testing, as well as of the amount realised after slaughter. By this experiment I hoped to obtain definite answers to the following questions:—

1. Old tuberculous cattle being removed, what would be the cost of keeping the purified herds free from tuberculosis during the first few years following the first application of the stamping-out measures?

2. What loss, if any, would be incurred by the selling to the butcher of young tuberculous carcases?

3. Would the tuberculin reaction prove a practical basis for the carrying out of the method I had suggested?

The second Ford Bank experiment was carried out according to the general plan indicated above. Circumstances, however, prevented our waiting for a time favourable to purchase on favourable terms. It was also found impossible to select the best time for fattening.

Mr. Ashton's steward bought, at the beginning of July, 1898, seven young heifers at the Stockport fair and three from a cattle owner. The purchase was completed by the 22nd. These animals were kept together till the 9th of August, and were then tested. It was found that six of the heifers reacted positively and four negatively. The six reacting positively were at once isolated and placed in a field where they could have no communication with other cattle. On the 19th of September the fattening of the ten heifers was begun. Linseed cake and maize meal were the foods used. During September the weather was very rough and cold, so that the animals did not get full benefit from the treatment; in fact, in Mr. Jones' words, "some of the stock barely held their own under these trying conditions. With the advent of October we had better weather, and a change of pasture set them going satisfactorily. The allowance of cake and meal was gradually increased from two pounds per head daily to four pounds of cake and two and a half pounds of meal. This was given along with a little chaffed hay to prevent waste, and was thoroughly cleared up by the stock at each time of feeding."

30. *Results of the second Ford Bank experiment. Meat value of tuberculous and non-tuberculous heifers under two years of age.*—The ten heifers were tested a second time on the 15th of November, with the result that the six which reacted in July reacted again, and the four which did not react continued to give a negative reaction.

They were then sent to be slaughtered at the Manchester Abattoir on the 22nd of November.

Their carcases were then examined by Mr. Holburn in the presence of Mr. Locke, who had tested the cows, and Mr. Jones; and Mr. Jones reported to me as follows: "In each case Mr. Holburn was able to say which of the animals had reacted *without any reference to the testing notes;* it was therefore perfectly clear that tuberculosis was present in all those animals that had reacted. In no case was it necessary to condemn any part of the carcase."

I have already given the results of the tuberculin tests and of the post-mortem examinations in the general table of results (Table I., Nos. 44 to 53).

In the table on the following page (Table IV.) I have summarised the points not included in the first one.

The gross outcome of the experiment is obviously a financial failure.

The original cost of the ten heifers, plus the cost of keeping them for four months and fattening them, had been £120 11*s.* 6*d.* The total sum realised after slaughter was only £90 12*s.* 2*d.* There was therefore a loss of about £3 per head. This loss was not quite so great as that borne in connection with cattle of all ages, which was over £5 per head, but in my opinion there should have been no loss at all; in fact, I expected a profit. There are, however, certain features of the experiment which account for the failure.

1. I have already explained that the cattle had been bought irrespective of the conditions of the market, and, as I understand, too late in the season.

2. The steward who bought the cattle had not much experience of the value of live stock: this was the opinion of two experienced men, who warned me, before the conclusion of the experiment, of the fallacy which this might introduce. It was also unfortunate that two heifers in calf should have been bought, as such animals, whatever their value might be in life, were not (before calving) suitable for the meat market. That the purchaser did not give evidence of much acumen was shown by the independent valuation obtained from a well-known and reliable expert four months after purchase and after the heifers had been kept under most favourable conditions and well fed.

The estimated value of three of the animals was found then to be respectively 15*s.*, 15*s.*, and £1 15*s.* less than the price paid for them. The estimated value of the other seven animals was in excess of the price of purchase by £1 10*s.*, £1 10*s.*, £2 15*s.*, £3 15*s.*, £3 5*s.*, and £1 5*s.* respectively. Notwithstanding all these differences, and the fact that the cattle had been bought from three different owners, a uniform price of £9 5*s.* had been paid for eight out of the ten heifers!

	£	s.	d.
The total sum paid for the ten animals in July was . .	96	0	0
Their total estimated value in November was	108	10	0
Their total cost, plus the cost of keeping and fattening, was in November	120	11	6

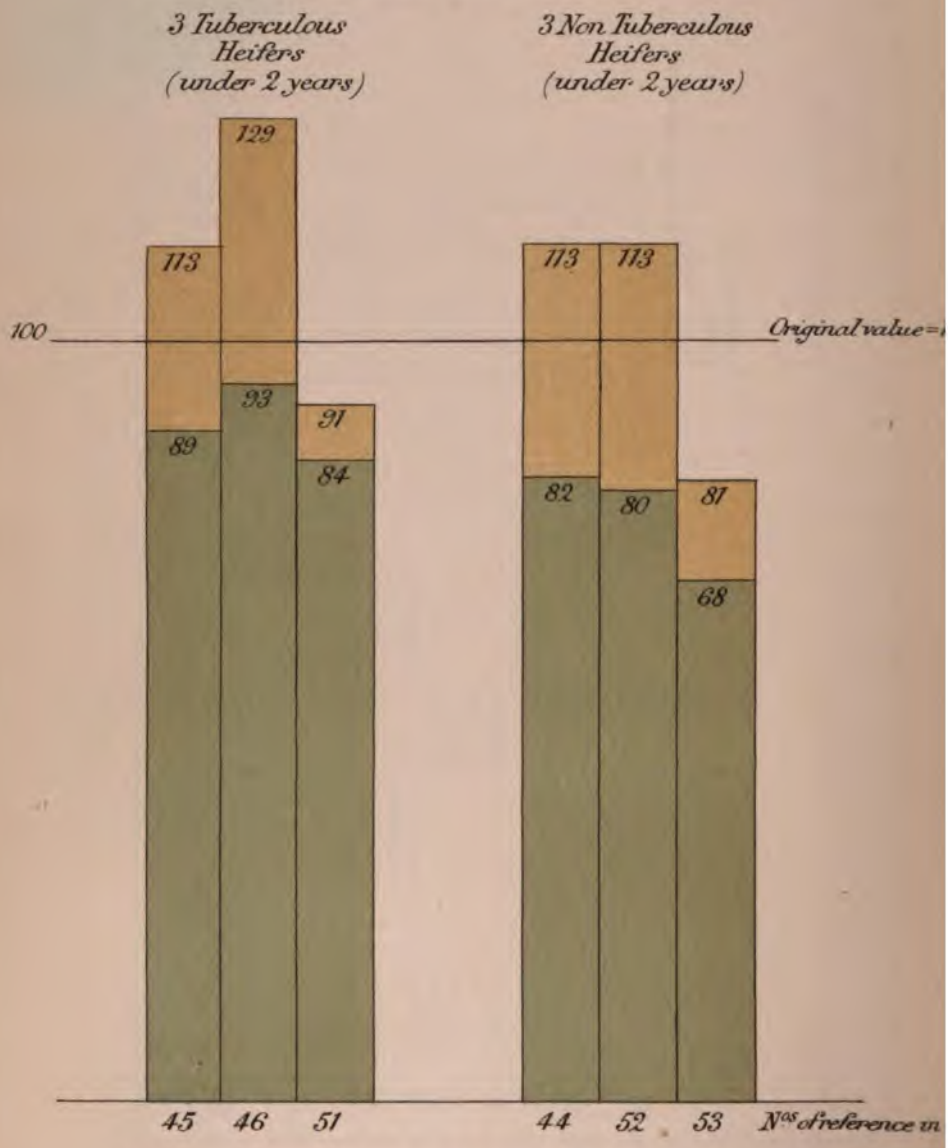
TABLE IV.

Number of Reference.	Age.	Race.	State.	Locality where bred.	Prime cost in July.	Total cost in November, including agistment, special feeding and testing.	Estimated value as live stock in November.	Results of two tests.	Results of post-mortem examinations.	Value obtained for the carcases without hide and offals, and total value obtained at the abbatoir.
					£ s. d.	£ s. d.	£ s. d.			£ s. d.
44	2 years off	Shorthorn .	Barren	Derbyshire .	11 0 0	13 10 9	12 10 0	−	−	9 1 6
45	2 ,,	Jersey Shorthorn cross .	,,	,, .	11 0 0	13 0 9	12 10 0	+	+	9 16 6
46	2 years .	Shorthorn .	,,	Yorkshire .	9 5 0	11 15 9	12 0 0	+	+	8 12 0
47	2 years off	,, .	In calf	,, .	9 5 0	11 15 9	13 0 0	+	+	7 15 0
48	1¾ years .	,, .	Barren	,, .	9 5 0	11 15 9	8 10 0	−	−	?
49	2 ,, .	,, .	In calf	,, .	9 5 0	11 15 9	12 10 0	+	+	7 12 3
50	2 ,, .	,, .	Barren	,, .	9 5 0	11 15 9	11 0 0	+	+	?
51	1¾ ,, .	,, .	,,	Lancashire .	9 5 0	11 13 9	8 10 0	+	+	7 16 0
52	2 ,, .	,, .	,,	,, .	9 5 0	11 13 9	10 10 0	−	−	7 9 0
53	1¾ ,, .	,, .	,,	,, .	9 5 0	11 13 9	7 10 0	−	−	6 7 0
					96 0 0	120 11 6	108 10 0			
						For the two carcases not identified .				14 18 0
						Hides and fat				11 4 11
						Offals				2 15 0
						Bellies and feet				1 10 0
										94 17 2
						Less toll, 10*s.* commission, £3 15*s.* 0*d.* .				4 5 0
						Total amount realised				90 12 2

If from this total expenditure the sum of £5 spent for the carrying out of the tests is subtracted, there remains a total expenditure of £115 11*s.* 6*d.* It is, therefore, obvious that even if tuberculosis had been out of the question,

DIAGRAM III.

SHEWING THE RELATIVE EFFECTS OF EARLY TUBERCULOSIS & ABSENCE OF TUBERCULOSIS ON THE VALUE OF 6 YOUNG HEIFERS EQUAL IN ORIGINAL VALUE & TREATED ALIKE FOR 4 MONTHS.



Yellow,—Estimated value before death, after 4 months keeping.

Green,—Value obtained for the carcase only, after slaughter.

These values are indicated in proportion of an original value of 100.

there would have been a loss on the transaction due to some error in the purchase. It is also possible that too much had been spent on feeding (£1 1*s.* 9*d.* per head).

The experiment has not therefore yielded the same results as it would have yielded in the hands of an experienced and skilful farmer. But although it was not successful with regard to management, it has nevertheless given very important results with regard to the relative value of the flesh of tuberculous and non-tuberculous young cattle.

The table of results gives the value obtained for eight of the ten carcases (two of them were sold together, and it was impossible to ascertain afterwards their separate value). The prices obtained for these eight carcases were as follows:—

A. Tuberculous heifers not in calf.		B. Tuberculous heifers in calf.		C. Non-tuberculous heifers not in calf.	
	£ s. d.		£ s. d.		£ s. d.
No. 45	9 16 6	No. 47	7 15 0	No. 44	9 1 6
No. 46	8 12 0	No. 49	7 12 3	No. 52	7 9 0
No. 51	7 16 0			No. 53	6 7 0
Total	£26 4 6		£15 7 3		£22 17 6
Average per head	£8 14 10		£7 13 7½		£7 12 6

(See Diagram III. at the end of this Paper.)

The same total price had been paid originally for the three heifers in group A and the three heifers in group C. There seems therefore *no evidence showing that a moderate amount of tuberculosis depreciates the meat value of young carcases.* As a matter of fact in this case better value was obtained for tuberculous carcases than for those free from the disease—a fact to which I will have to allude again.

This matter being one of great importance, I thought it desirable to obtain an independent opinion from Mr. Holburn, who had inspected the carcases; I therefore asked him to give me without any reserve his views on the results we had obtained. With his permission I reproduce his answer:—

"Markets Department,
"City Abattoirs,
"Water Street, Manchester,
"January 23, 1900.

"DEAR PROFESSOR DELÉPINE,

"In answer to your inquiry as to the market value of Mr. Ashton's experimental cattle, and as to whether there was any difference in the conditions of those animals that reacted to the tuberculin test from those that did not react, as regards their saleability, I feel quite confident in expressing the opinion that as regards their carcase value those animals that reacted

came out as well as—in fact, one or two of them a little better than—those that did not react to the test.

"It must be remembered, however, that none of the reacts were extensively diseased.

"The viscera of the chest were principally involved, there was slight pleurisy in two or three cases. Otherwise the carcases were not affected.

"The second heaviest carcase was one that had slight pleurisy, with the mediastinal lymphatic gland much diseased, but a good carcase of beef, which realised in the market (wholesale market) as much per pound as any other.

"Speaking generally, none of the animals were really ready for the butcher; youth was against them, and they had not had time even on a good keep to get ready. Further, two of them were heavily in calf, one probably not more than six or seven weeks from being due; this of course caused their carcases to be short in flesh and not so bloomy as they otherwise would have been; there was, in consequence, depreciation in value for butcher's meat.

"The above results only further corroborate what one sees at the abattoir, viz., that the best of animals may be affected with tuberculosis, and that if the disease is limited in its distribution and not sufficiently developed to necessitate the confiscation of any part of the carcase, the carcase will in the dead meat market realise as good a price as if it had not been tuberculous.

"ALFRED HOLBURN, M.R.C.V.S.,
"Chief Inspector."

This valuable statement is in complete agreement with the results I have recorded above. It is, however, evident that it would have been preferable to use animals two and a half or three years old for the experiment. The age I had fixed was two years, in order to avoid cows in calf, but this complication was not successfully avoided. Taking everything into consideration, it seems therefore evident that if *young tuberculous cattle be properly prepared for the meat market there could not be a more profitable or convenient way to dispose of them than by that method. It is equally certain that at no other period in their life could their flesh be utilised with less danger to public health*, a danger which should disappear entirely if private slaughter-houses were entirely abolished and all the meat submitted to thorough inspection, as it is in the Manchester City abattoirs. In speaking of danger from the consumption of the flesh of tuberculous animals I do not wish to convey the idea that the danger is great in any case. The possibility of infection by highly tuberculous meat is, however, sufficient to justify preventive measures.

E. *Disposal of Tuberculous Cows and of their Milk.*

31. *Removal of tuberculous milch cows between the ages of three and eight years.*—Whilst I consider it advisable to deal with young stock under three years of age as rapidly as possible, I think that the indiscriminate slaughter of all tuberculous animals above that age would be attended with considerable and unnecessary losses.

Only cows in an advanced stage of tuberculosis, showing evidences of wasting or of tuberculosis of the udder, should be slaughtered without delay. They are serious sources of infection, and the longer they are kept the less their value will be, if they retain any at all.

With regard to *cows clinically in a good state*, but which are shown to be tuberculous by the tuberculin test, the experiments which I have related show clearly that those which are in calf or in milk should not be slaughtered at once.

Such cows should be isolated. The calves of tuberculous cows should be taken away on the first or second day and brought up on boiled milk obtained from the isolated tuberculous milch cows. The cows in milk should be milked as usual until lactation ceases or can be made to stop without injury to the state of the animal. As soon as these cows are dry they should be fattened for the butcher.

32. *Disposal of the milk of isolated tuberculous milch cows.*—All the milk of tuberculous cows should be kept separate from the milk of sound cows. It is impossible in the present state of our knowledge to recognise the earlier stages of tuberculosis of the udder, either by systematic inspection of the udder or by the characters of the milk.* All the milk of tuberculous cows should therefore be sterilised before being used. This should be done by boiling it. I have made a number of experiments to find whether pasteurisation could be relied upon for this purpose. This I thought of great importance, because if it had been possible to destroy the tubercle bacillus at a low temperature without affecting the quality of the milk or cream, the losses due to isolation of tuberculous milch cows could have been considerably reduced by utilising their milk for the manufacture of butter. The results of the experiments which I will briefly relate have convinced me that the heating of milk or cream to a temperature sufficient to ensure the death of tubercle bacilli renders the cream unfit for the preparation of butter having a pleasant taste.

33. *Experiments on the sterilisation of tuberculous cream.*—At the beginning of 1899 Mr. John Benson, then manager of the Midland Dairy Institute, undertook at my request to prepare for me samples of butter made from cream exposed to temperatures of 150°, 170°, and 180° F.; other samples of butter being also made for comparison with the same cream ripened and unripened. In each case in which the cream was heated, the length of exposure was calculated from the time when the temperature wanted had been reached.

* It is obvious that the testing of all the milk by inoculation is an impossibility.

GENERAL RESULTS OF EXPERIMENTS ON THE STERILISATION OF CREAM.*

	Temperature.		Duration of Exposure after the Temperature indicated had been reached.	Result as indicated by comparison with control.
	Centigrade.	Fahrenheit.	Minutes.	
1st set of experiments.	74°	165°	30	Tuberculosis slight and delayed, but distinct after three weeks.
,, ,,	76°	170°	10	Tuberculosis slight and delayed, but distinct after three weeks.
,, ,,	82·5°	180°	5	Tuberculosis well marked nearly normal.
2nd set of experiments.	85°	185°	15	Tuberculosis considerably delayed (two months).
,, ,,	70°	158°	45	Tuberculosis delayed, but well marked after three months.
,, ,,	65°	149°	360	*No tuberculosis after three months.*
,, ,,	65°	149°	180	Slight tuberculosis after one month.
,, ,,	64°	149°	60	*No tuberculosis after one month.*
,, ,,	Control animals inoculated with the same amount of sputum cream as in the other experiments.	not	heated	Well marked tuberculosis after three weeks.

(*A.*) Cream kept for five minutes at a temperature of 180° F. (82° C.) yielded a butter which was hard, contained less water than the butter made with the same cream not heated did, and had a slight taste of boiled milk, and after a few days, instead of having the usual rancid taste and smell, it had the smell of putrid proteid matter.

(*B.*) Cream heated for ten minutes to 170° F. (76·6° C.) yielded butter resembling very closely the butter made from cream heated to 180°.

(*C.*) Cream heated for ten minutes, or for thirty minutes to 150° F. (65·5° C.), had all the characters and the taste of good fresh butter, and kept as well as, if not better than, butter made from the same cream in the usual way (sample D).

Several persons not acquainted with the nature of the experiment were asked to taste these various samples of butter, and all preferred the taste of sample C to that of the other samples. The same results were obtained on

* I wish to acknowledge here the cordial assistance I received from Dr. Sidebotham and Dr. Coutts in the carrying out of these experiments, some of which lasted a considerable time.

two different occasions. The changes observed in the buttermilk were also characteristic.

The buttermilk of sample A contained on the second day a very large number of bacteria, and had a distinct putrid smell on the fourth day.

The buttermilk of sample C contained comparatively few bacteria, and remained sweet for seven days.

The buttermilk of sample D contained many bacteria, and became sour, but not putrid, on the fourth day.

I think the putrid changes observed in samples A and B are due to the retention in the butter of proteids coagulated by heat. According to Bang it should be possible to obtain good butter with cream heated to 85° C., *i.e.*, to a higher temperature than the highest used in my experiments, which therefore do not confirm his statement.

The second part of my experiments on the sterilisation of cream were still more disappointing, for they revealed the fact that it is not safe to rely upon exposure to a temperature of 85° C. for the rapid destruction of tubercle bacilli in cream.

On two different occasions I mixed some tuberculous sputum containing a large number of tubercle bacilli with recently separated cream. To ensure thorough admixture the sputum was gradually rubbed into the cream by means of pestle and mortar. Each sample of the mixture used for inoculation was examined microscopically in order to ascertain whether tubercle bacilli were present. The infected cream was heated in *narrow* test tubes containing a thermometer, the tubes being immersed in oil baths kept at a constant temperature, the arrangement being the same as that usually adopted to find the heat coagulation temperature. Every care was taken to ensure that all the parts of the cream were submitted to the same temperature. The effects of heating were tested in each case by the inoculation of two guinea-pigs.

I cannot give fuller details of these experiments here, but I should explain that the absence of absolute uniformity was due to the fact that the cream contained, in addition to tubercle bacilli, some pyogenic organisms; these in some of the animals caused the occurrence of acute inflammatory lesions, which interfered with the regular development of tuberculosis. It will be noticed also that in several cases evidences of tuberculous infection were noticed only after an interval of two or three months, whilst in control animals typical tuberculosis was invariably produced in three weeks. The fact, however, remains that no reliance should be placed on exposure of cream to temperatures up to 85° C. for the times indicated in the table on the opposite page. I regret to say that in a previous paper I had expressed the opinion (which is supported by some of the above experiments) that a lengthened exposure of cream to a temperature below 85° C. would probably be sufficient to destroy the tubercle bacilli. I stated, however, at the same time that I had not completed the experiments which I was making with the view of confirming the experiments of other observers. (See *Veterinarian*, July and August, 1899.) In my opinion, therefore, the *milk of all tuberculous cows should be boiled before it is used.* I do not venture at present to suggest other means of utilising this milk. All I wish

to do is to express a *warning against a too implicit belief in the statements which have been made regarding the ease with which the milk of tuberculous cows can be rendered innocuous.**

F. *Innocuousness of Tuberculin Inoculations.*

34. *Effects on healthy dairy cattle of periodical testing with tuberculin. Results of Ford Bank experiments.*—It has been frequently stated that the use of tuberculin was detrimental to milch cows. Not being able to investigate this matter personally, I have asked Mr. J. Jones to give me his impressions upon the effects which our experiments had had on the dairy cows kept at Ford Bank. The following were his answers:—

1. "The quality of milk from tested stock was all that could be desired.

2. "I do not consider testing to be at all detrimental to dairy stock in any way, if carefully done."

Results of experiments by Mr. Walter W. Law, of New York.—Knowing that Mr. Walter W. Law, of Briarcliff Manor, New York, had for some years past determined to clear his extensive herds from tuberculosis, and had had for this purpose his cows repeatedly tested with tuberculin, I asked him to supply me with some information on the effects of the testing on healthy cows. He had the great kindness of forwarding my request to Professor Leonard Pearson, of the University of Pennsylvania, who inspects bi-annually the Briarcliff Farms dairy herd. This herd is composed of over 600 "thorough-bred or high-grade" Jersey cows. Professor Pearson replied as follows:—

Opinion of Professor Leonard Pearson.

"UNIVERSITY OF PENNSYLVANIA.

"Department of Veterinary Medicine,
"Philadelphia,
"March 31st, 1900.

"DEAR SIR,

"In reply to the questions submitted by Professor Delépine regarding the effect of tuberculin on healthy cows, I would say:—

"1. No effect on the flesh or the weight of the animal has been observed. The members of the Briarcliff herds, tested twice each year, are in high condition.

"2. The quantity of milk usually diminishes slightly for the milking of the morning following the administration of the tuberculin. This diminution is not constant, and is not greater than often occurs at other times from a change of feed, a change of weather, or other natural cause. The loss does not exceed 5 per cent. of the total product of the herd.

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* These experiments will be further controlled by submitting milk and cream from a tuberculous udder to the same tests. They will also be extended in the direction of long exposures to a temperature of 65° C., which has proved efficient in one of the above experiments.

"I have the impression that this is due to the slight disturbance to which the cows are subjected during the test.

"The herd as a whole is remarkably productive; the yield per cow per day often exceeds twenty pounds *in the winter*.

"3. No change in the richness of the milk has been observed. It is very rich.

"It is not possible at Briarcliff to compare tested and untested cows in respect to the above points, because there are no untested cows on the farm. It is clear, however, that the Briarcliff standard is extremely high in regard to all of them.

"I may add that the large herd (500 milch cows) of Mr. Francisco in New Jersey is tested with tuberculin, and Mr. Francisco states that his herd is more productive and the cows in better condition than before it was his practice to test. Mr. Gordon, of the Walker-Gordon Laboratory Company, holds the same opinion as a result of his experience with herds aggregating more than 500 cows.

"Yours very truly,

"LEONARD PEARSON.

"To WALTER W. LAW, Esq.,

Briarcliff Manor, New York."

G. *Disposal of Valuable Stock.*

35. *Disposal of valuable pedigree stock.*—With regard to valuable pedigree stock, kept chiefly for breeding purposes, the losses caused by immediate slaughter are very considerable. I am, however, of opinion that *immediate slaughter of such animals is necessary only in the event of their being affected with advanced tuberculosis or of their suffering from tuberculous lesions of the generative organs.*

I have had the opportunity of watching the progeny of a number of tuberculous cows and bulls in good condition, and, like several observers, I have found that when the calves are taken immediately after birth from their dam and fed on sterilised milk, they do not appear to be more liable to tuberculosis than calves from non-tuberculous animals reared under the same conditions. On the other hand, I have had the opportunity of studying fully two cases of so-called congenital tuberculosis in the calf, and in both cases the uterus of the dam was the seat of extensive tuberculous lesions. I would, therefore, urge that pedigree cattle in which tuberculosis has not produced serious lesions should be carefully isolated and watched, that these animals should be used for breeding purposes, then slaughtered as soon as possible after they have sufficiently fulfilled the purpose for which they are kept. In the event of the disease affecting their general health or the generative organs, they should be slaughtered without delay.

H. *Market Value of Living Tuberculous Animals.*

36. *Effect of moderate tuberculosis on market value of living cattle.*—Before concluding I must refer to an aspect of the question which the experiments previously recorded bring out. Early tuberculosis, far from affecting detrimentally the appearance of young and middle-aged stock, is often associated with all the external appearances of flourishing health. Many tuberculous cows are exceptionally good milk producers. They have often a very good market value during life. It is not, therefore, easy to persuade the farmer that tuberculosis may be a serious source of loss to him. He does not consider it a matter of importance to discover whether a cow is tuberculous or not, so long as she is a good milk producer or does not lose flesh. It is not denied that a herd affected with tuberculosis is liable to greater depreciation than a herd free from tuberculosis, but it is urged that in the present state of things the loss of capital involved by the removal of tuberculous cattle would be so great that the ultimate benefit would not be sufficient, nor obtained soon enough, to prevent ruinous losses. It is therefore stated that farmers cannot be reasonably expected to adopt measures which would be contrary to their own interests.

If the matter could be considered in the light of a commercial transaction affecting only one generation of speculators, having no responsibility towards their country or humanity, the above argument might be considered sound. It is, however, the duty of the State to see that the present generation does not sacrifice for its own benefit the patrimony of future generations, thereby doing great harm to the country. It is also the duty of the State to see that any condition of things which tends to perpetuate the existence of a disease which is so detrimental to man as well as to the lower animals is checked as speedily as possible. Even if the financial argument against the stamping out of tuberculosis were as sound as it appears to be, it does not prove that farmers are justified in remaining passive. If through ignorance they have allowed the evil to grow beyond control, they cannot consider this a valid excuse for not doing their duty as soon as they know what their duty is.

Necessity of reasonable compensation.—The fact, however, that the carrying out of this duty towards the State would mean complete ruin in the case of many small farmers, whose welfare is also of importance to the whole country, clearly shows that a part of the losses caused by the stamping out of tuberculosis should be borne by the State.

Conclusions.

37. *Summary of results obtained.*—1. Tuberculin is an almost infallible test of the presence of tuberculosis in animals under seven or eight years of age when this fluid is used with proper care. In older cattle clinical methods are more reliable than the tuberculin test as used at present. It is, however,

possible that the use of large doses of tuberculin might be resorted to with advantage in the case of aged cattle.

2. It is possible by the use of tuberculin and thorough disinfection of cattle sheds to stamp out tuberculosis from a herd in the course of one year.

3. Cases of infection which may accidentally occur after this preliminary removal of tuberculous cattle can be easily and economically detected by the periodical use of tuberculin.

4. Tuberculous animals between two and three years of age can be disposed of on the meat market without serious loss.

5. The slaughter of cows in calf or of milch cows not in an advanced stage of tuberculosis involves a serious loss to the farmer, and, so long as tuberculosis is as prevalent as it is at the present time, it is doubtful whether the measures necessary for the extirpation of tuberculosis can be left to private efforts without State help.

6. To prevent further infection, immediate slaughter should be resorted to in the case of all animals in a state of advanced tuberculosis, and of all cows with tuberculosis of the udder.

7. Milch cows and cows in calf in which tuberculosis is not very advanced should be isolated and slaughtered only after they have been suitably prepared for the butcher. The milk of tuberculous cows should invariably be sterilised by boiling.

8. Valuable breeding animals free from advanced tuberculosis or tuberculosis of the generative organs should be isolated; they can be kept *for a time* for breeding purposes, provided the calves are isolated and fed on sterilised milk.

9. Measures which do not provide for the removal of all tuberculous animals from a district, for the disinfection of all cattle sheds in that district, for the periodical testing of all animals within the district, and which do not give the means of preventing the importation of tuberculous animals, cannot be expected to yield satisfactory results.

38. *Suggested general measures.*—On the basis of these conclusions I feel justified in recommending once more the general measures which I have advocated on several occasions during the last few years. These may be summed up as follows :—

1. Division of the whole country into a number of well-defined *administrative areas*, each provided with an efficient staff of veterinary inspectors.

2. *Marking and registration* of all cattle for purposes of inspection and notification. (This would, of course, mean the inclusion of tuberculosis among the recognised contagious diseases.) *Systematic periodical inspections* of herds and cowsheds within each administrative area. Testing with tuberculin of all cattle.

3. *Isolation* of all tuberculous cattle. *Disinfection* of sheds which have been occupied by tuberculous cattle.

4. *Immediate slaughter* of all cattle in an advanced state of tuberculosis (including all cases of udder tuberculosis).

9. *Fattening of all animals not in an advanced state of tuberculosis* for the

meat market. All cattle should be slaughtered in *public abattoirs*, so as to ensure *thorough meat inspection.*

6. *Compensation* during one year or two for losses incurred by owners of cattle, *except in cases when there had been gross or culpable neglect.* After this *transitional period of compensation* the presence of a case of advanced tuberculosis in a cowshed to render the owner liable to a penalty.

7. *Testing of all cattle brought into the area*, so as to prevent the introduction of fresh sources of tuberculosis. No cattle above six years of age to be imported.

8. All the *milk from tuberculous cattle to be boiled* before use.

9. Control of all foreign dairy produce, so as to enforce the same standard of purity as in the case of home produce.

10. To avoid a sudden national depression in the dairy industry, I further suggest that *the enforcement of these measures should not be simultaneously carried out all through the country*, but that they should be at first enforced in a certain number of well-demarcated administrative areas, to which year after year other districts should be added until the whole country was under administrative control. It is probable that the work could be accomplished in some five or six years.

Dr. Boobbyer (Nottingham): I must apologise to Professor Delépine for not discussing the subject of his paper directly, but I think we must all recognise by this time as an undoubted fact that what has been termed the "bomb" thrown into this Congress by Professor Koch has robbed a great deal of the other most interesting matter which has been brought forward for discussion of much of its immediate interest. It is out of the question for us to ignore the pronouncement of Professor Koch with regard to the relations of bovine to human tuberculosis. Those persons who look at the question from a purely academic standpoint, the unofficial bacteriologists and others, may calmly await the decision of the issue by direct and distinct experiment; but it must be apparent to everyone that the executive officers—for instance, persons like myself—and meat inspectors, the heads of Health Departments in our cities, cannot afford to wait at all. We are in an extremely uncomfortable position. I do not think we give ourselves away by saying that. I have heard from gentlemen that I know myself, who are connected with the meat and milk trade, that they consider it an extremely good thing for them that Professor Koch has delivered himself as he has; and there is not the slightest doubt that they will know how to make the best possible use of statements which he has made. It would be out of place for me to discuss the scientific value of the statement made by Professor Koch I should much prefer to refer to remarks of men like Lord Lister and Professor Sims Woodhead on the subject. I will only say that I entirely agree with those and other speakers in thinking that the facts upon which Professor Koch acknowledges that he has gone in arriving at the conclusions he has laid before us, are insufficient to justify those conclusions. (Hear, hear.) As to the manner in which this has been sprung upon us, I think the

Number of reference.	Sex.	Lesion. (Yes given.)	Value of carcases at abattoir. £	s.	d.	Prices of living animals sold by auction. £	s.	d.	Remarks.
1	F.	3					..		..
2	F.	5 eric glands	12	15	9		..		2 forequarters condemned.
3	F.	. . . .	8	3	3		..		..
4	F.	3 . . .	13	5	0		..		..
5	F.	ds . . .	12	1	6		..		..
6	F.	7 . . .	13	5	0		..		..
7	F.	2 . . .	13	5	0		..		Slightly tuberculous, found by microscopical examination only.
8	F.	2	14	10	0		..		..
9	F.	2 ernal glands	13	10	6		..		..
10	M.	1		..			..		Whole carcase condemned.
11	M.	1 ritoneum .		..			..		..
12	M.	1 eric glands	9	19	0	24	0	0	Perfectly healthy.
13	F.	3		..		16	10	0	,, ,,
14	F.	6		..			..		..
15	F.	1 nds . .	13	5	0				
16	M.			..		10	5	0	Healthy.
17	F.			..		9	10	0	,,
18	F.			..		11	17	6	,,
19	F.			..		9	10	0	,,
20	F.	2		..		7	15	0	..
21	F.	3	11	4	5		..		..
22	F.	2		..		16	7	6	Healthy.
23	F.	3		..		12	15	0	,,
24	F.	2		..		16	10	0	,,
25	F.	2		..		15	5	0	,,
26	F.	2		..		13	0	0	,,
29	F.	2		..		15	10	0	,,
30	F.	6	15	14	0		..		..
31	F.	3	17	0	3		..		..
32	F.	3		..		18	10	0	Healthy.
33	F.	3	16	18	0		..		..
35	F.	3		..		17	0	0	Healthy.
36	F.	7		..		15	15	0	,,
38	F.	6		..		14	0	0	*Failure of first test, owing to cow newly calved.
39	F.	5		..		10	15	0	Small and in poor condition.
40	F	7		..		17	5	0	Healthy.
41	F.			..		19	0	0	,,
42	F.	4		..		9	5	0	,,
43	F.	6		..		17	0	0	,,
44	F.	2		..		16	10	0	..
45	F.	2	9	1	6		..		..
46	F.	2	9	16	6		..		..
47	F.	2	8	12	0		..		..
48	F.	1	7	15	0		..		..
49	F.	2		..			..		..
50	F.	2 stinal glands	7	12	3		..		..
51	F.	1		..			..		..
52	F.	2 stinal glands	7	16	0		..		..
53	F.	1	7	9	0		..		..
54	M.	—	6	7	0		..		..
55	M.	—		..		4	15	0	Healthy.
56	M.	—		..		4	15	0	,,
57	F.	—		..		5	0	0	,,
58	F.	—		..		4	5	0	,,
59	M.	—		..		4	5	0	,,
60	M.	—		..		2	2	6	,,
61	M.	—		..		8	5	0	,,
62	F.	—		..		2	17	6	,,
				..		3	2	6	..

N.B.— he experiment are given instead of a number of reference.

[To face page 278.

(1899) Ex

imate of loss on capital—*cows and heifers* nly. Loss on d iry produce not included.*

	Number and Average — each animal, valuable stock excluded.	Loss per 100 cattle of each group.	Estimated value of 100 head.	Loss per cent. of capital.
GROUP I.— Animals 5 year and over.	..	..	..	..
Ford Bank — Old stock .				
New stock 3 ..	£7 7	£735	£1900	38
Cheshire C.C. 2 ..	..	..	..	..
	6 1	189	1515	12·47
GROUP II. — 3 years and up 5 exclusive.	..	..	..	..
Ford Bank— Old stock .				
New stock ..	8 6	622	2015	30·86
Cheshire C.C. ..	..	..	..	..
1 bu goo bree .. 2·1	11 12	240	1800	13·33
GROUP III.— 2 years and 3 exclusiv ..	..	..	..	..
Ford Bank— Old stock				
New stoc ..	No loss	..	1400	..
Cheshire C ..	..	..	..	..
bul pure bree 25·12	No loss	..	1300	..
GROUP IV. 1 year an 2 exclus ..	..	..	..	..
Ford Ban Old sto				
..	No loss	..	800	..
Cheshi ..	..	..	800	..
GROUP Up to clusi ..	..	..	..	..
Ford Old New ..	No loss	..	320	..
Cheshi ..	..	..	..	..
..	..	..	..	..
Gr ..	..	..	..	..

mall to base upon it any calculation.

v

[*To follow Table I*

unfitness of it is self-evident. (Hear, hear.) The criteria upon which we have hitherto regulated our conduct towards tuberculous meat and milk are those afforded by the memorandum circular letter that the Local Government based upon the finding of the Royal Commission dated March 10th, 1899, and the latest Milk Shops Order. Whatever the butchers may say, all the practising Medical Officers of Health in any considerable towns with which I am acquainted rule their conduct with regard to meat entirely by that memorandum. (Hear, hear.) My inspector and I seldom travel without a copy of that memorandum, and when we are called to decide upon any border-line carcase, I always carefully compare the conditions we find in the carcase with the criteria furnished by this memorandum, so that the remarks that some of the gentlemen connected with the trade made yesterday are not entirely, so far as my experience goes, in accordance with facts. What we shall do in the future—I have to act in the immediate future in this regard—is still to say, when the magistrates ask us what system we adopt, that this memorandum is our guide. On the other side, the statement of Professor Koch will be cited. We shall be asked if we recognise him as an authority; and if we state to the magistrates that we recognise him as an authority—as Lord Lister said, the most eminent bacteriologist of the present day—the fact of our acknowledging that, and of his making these statements, will be sufficient to deter the magistrate from in many cases, I take it, convicting at any rate. And then where are we? I do not wish to labour this matter. In view of the emergency thus created by the extremely undesirable position in which we as executive officers are placed by this latest pronouncement, I consider it eminently desirable that we should approach the Local Government Board, and I should like to propose this Resolution, if it is acceptable to you: "That it be a special instruction to the deputation which, I take it, will go from this Congress to the Local Government Board, to ask that the Local Government Boards of England, Scotland and Ireland be most respectfully and urgently requested to issue a circular, comparable with that of March 10th, 1899, issued by the London Board, setting forth the line of action which in their opinion should be followed by local authorities and their officers in dealing with tuberculous meat and milk." I beg to propose that.

Councillor James Dick (Glasgow): I have much pleasure in seconding the motion which has been submitted to this Section by my friend Dr. Boobbyer. I happen to be Chairman of Health for the city of Glasgow, and there we have been carrying out meat inspection in a very thorough and complete way—much more complete than most local authorities have been able to do it—within the last few years. Personally, I feel that we shall have a great deal of difficulty between now and the time that must expire before Professor Koch's new discovery is either established or is overthrown, and there will be a very awkward time unless we get some measure of backing in every kind of way, and do not give up all the measures that we are now carrying out for securing that tuberculous meat or milk shall not be sold. We ought to keep the present regulations in full force from now until such time as this new

theory of Professor Koch's is either established or otherwise dealt with. I am all the more inclined to do so from this point of view—that Professor Koch himself has very clearly and very forcibly put before us in his paper the necessity of this being done until this new theory of his is either established or otherwise dealt with, and it is only carrying out what it seems to me is Professor Koch's idea, that we shall not alter the administration of affairs, and that the means that we are taking to prevent the sale of tuberculous meat or milk should not be slackened in any one respect until it is really established or disproved. I am quite satisfied that there will be a very great difficulty raised in connection with the administration of it. We have heard Dr. Koch, and have passed a resolution that we shall do so-and-so. Certain parties, as Dr. Boobbyer said, can afford to wait; the scientific people can afford to wait; but those of us who are bearing the burden and heat of the day, and seeking to carry the regulations through, must do all we can to see that no step is threatened and no step is taken which is in the least likely to upset the present state of affairs until the theory is thoroughly established or disproved. I do trust that this Section will, without a moment's hesitation, pass the resolution which has been submitted by Dr. Boobbyer, and that we shall all do what we can to maintain the present *status quo* until the matter is finally disposed of. I heartily second the motion.

THE PRESIDENT: The Resolution I have to submit is: "That the Local Government Boards of England, Scotland and Ireland be most respectfully but urgently requested to issue a circular, similar to that of March 10th, 1899, issued by the English Local Government Board, setting forth the line of action which in their opinion should be followed by local authorities and their officers in dealing with tuberculous meat and milk."

The Resolution was put and carried unanimously.

ON THE INFECTIVITY OF THE MILK OF COWS WHICH REACT TO THE TUBERCULIN TEST IN THE ABSENCE OF CLINICAL EVIDENCE OF TUBERCULOSIS.

BY E. J. MCWEENEY, M.A., M.D., D.P.H.,

Bacteriologist to the Local Government Board for Ireland.

(Abstract only; references to literature purposely omitted.)

THE milk of cows suffering from tuberculous mammitis is admittedly infective. This condition is rare, and the author has not met with a single case in the course of his experiments on a herd of high-class dairy cows. About 60 per cent. of the animals were, however, found to be suffering from tuberculosis in a chronic and localised form devoid of clinical phenomena, and only recognisable during life by means of the tuberculin test. The author

undertook to ascertain whether the milk of such animals—forming, as it does, a large percentage of the milk supply of this country—is liable to contain virulent tubercle bacilli.

The experimental work has only been commenced within the last two months, and but sixteen results are as yet complete. These are uniformly negative. The milk used is drawn into sterile vessels and the sediment from about a litre is injected subcutaneously into the thigh of a guinea-pig. The bulk of fluid injected does not exceed one cubic centimetre, and arrangements are made to ensure that this amount will contain all the sediment obtainable from the litre of milk by the aid of a powerful steam centrifuge. In certain of the experiments some of the cream was likewise injected into the opposite thigh. This likewise yielded a negative result on each of the four occasions it was tried.

Control experiments were made with material containing very few tubercle bacilli, such as caseous matter from a scrofulous gland from the cervical region of a child, and material from an abscess in the lung of one of the cows, the milk of which had been used for injection, and which was killed for the purpose of ascertaining to what extent it was affected with tuberculosis. In neither of these specimens of caseous matter could tubercle bacilli be demonstrated microscopically. A little of the material was rubbed up with a cubic centimetre of sterile milk, and injected. In each case the animal developed typical tuberculosis in the lesions of which the bacillus was readily demonstrated.

These experiments are being steadily carried on. Their uniformly negative result up to the present leads the author to suspect that where positive results have been obtained with the milk of such animals, the result may have been due to accidental contamination of the milk by means of dust, vessels, or the like in infected byres.

The milk used by the author was collected with precaution in sterile vessels. It would be interesting to experiment with milk from similarly diseased cows, but collected in the ordinary way. Positive results might then, he suspects, be obtained.

By Dr. MALM, *Director of the Veterinary Service, Christiania.*

1. The tuberculin employed for diagnosis should be a tuberculin produced on the same principles as that of Koch in 1890.

Its strength should be uniform, and it should be of such toxical strength as to kill with certainty six to eight weeks' old tuberculous guinea-pigs within eight hours in doses of 20–30 centigrammes subcutaneously.

2. Such a tuberculin produces unfailingly in tuberculous animals a febrile reaction of a distinct type. It is recommended that large doses should be given, even to young animals; there is no danger or inconvenience in always employing doses of a half to one gramme

3. Tuberculin may at times also produce fever in non-tuberculous animals,

but this fever is not typical and does not attain such a degree as in tuberculous cases.

4. If a typical tuberculous reaction appears in an apparently healthy animal, and on dissection nothing tuberculous is found, it is the fault of the dissector.

5. To determine with certainty whether reaction exists or not, it is necessary to take the temperature from the sixth to the twentieth hour after injecting, hourly, or at least every second hour.

6. The fact that tuberculin in a few isolated instances produces fever in non-tuberculous animals is of no importance when the question is its usefulness as a means to eradicate tuberculosis, for in this respect it is decisive, as tuberculin invariably causes reaction in tuberculous animals.

7. The foregoing refers to animals treated for the *first* time. Most animals become more or less accustomed to the tuberculin, but this is uncertain and unreliable, and can be overcome by the use of an increased dose or a tuberculin of greater toxical strength.

8. The practical combating of tuberculosis concerns administrative, economical and social spheres, and the answer must vary in different countries, according to the prevalence of the disease and its extent, the system of farming and cattle trade, and the pecuniary means available.

THE ADMINISTRATION OF THE MANCHESTER MILK CLAUSES, 1899.

By JAMES NIVEN, M.A., M.B., B.C. (Cantab.),
Medical Officer of Health.

With a Statement by J. S. LLOYD, M.R.C.V.S., on the work done by him as Veterinary Surgeon to the Sanitary Committee of Manchester.

The evidence showing that tuberculous milk has been the cause of tuberculous disease demonstrated in the bodies of children who have died from tuberculosis or other disease is, from a variety of causes, rather scanty. Some evidence has, it is true, been collected to show that there is a disproportionately large amount of primary abdominal tuberculosis in young cattle, but no demonstration has been given that this is due to milk.

Exact post-mortem examination records show that there is an almost complete absence of tuberculous lesions in new-born infants, while the proportion of children suffering from tuberculous lesions, abdominal and other, steadily increases with advancing months and years. Such records also show that primary abdominal tuberculosis is much more frequent in infants than in adults.

It is open to us to infer that the food of young children and of young cattle is more liable to produce tuberculosis than the food of adults and of full-grown cattle. This is, however, only a probable conclusion.

The conclusion is rendered much stronger by the evidence of feeding experiments, such as those made by Chauveau and Jöhne, and repeated with milk from tuberculous udders for the Royal Commission on Tuberculosis (1895) by Drs. Woodhead and Sidney Martin, who showed that the milk from tuberculous udders was virulently infective when fed to calves, kittens, pigs, and guinea-pigs.

The Royal Commission were so much impressed by the evidence which they obtained on this subject that they recommended, *inter alia*, that for the purpose of excluding from their districts the milk of cows affected with tuberculosis of the udder, or exhibiting clinical symptoms of the disease, local authorities should be given powers somewhat similar to those of Sections 24–72 of the Glasgow Police (Amendment) Act, with power to slaughter such cows, subject to compensation under the conditions named in the report.

In 1896, 1897 and 1898 a series of examinations of the cows within the city, and of suspected farms outside the city, were made under the direction of the Medical Officer of Health by Mr. King, then veterinary surgeon of the Corporation, at first with a view to furnish evidence for the Royal Commission, and subsequently to determine the lines which administrative action should take. In this preliminary work we were under a great obligation to Mr. Holburn, the present chief veterinary surgeon of the Markets Department, as well as for subsequent assistance. Professor Delépine undertook a careful investigation of the milks obtained from suspected udders, and of the conditions to be observed in concluding that a particular milk was infectious.

Professor Delépine had previously improved the inoculation test by showing that much increased precision was obtained by inoculating guinea-pigs in the posterior limbs.

Out of ten samples of milk taken rom indurated udders, he found by microscopic examination and the inoculation test that only five were tuberculous. From this and other observations it was concluded that veterinary observations do not suffice alone to determine whether an udder is tuberculous, and our subsequent experience amply confirms this conclusion.

In 1897 and 1898, twenty samples taken at railway stations were found to be tuberculous by Professor Delépine. Sixteen of the corresponding farms were visited by Mr. King, and on fourteen out of sixteen he found cows having indurated udders. It was not then considered necessary to conclude the evidence by examining the milk from these udders.

Ample evidence, however, had been secured to show that valuable results could be obtained by taking advantage of the recommendations of the Commission already quoted.

The Sanitary Committee of the city determined, in September, 1898, to apply for powers similar to those enjoyed by Glasgow. As originally drafted, the Manchester Milk Clauses sought unlimited power of inspection of the cows on all farms supplying milk to Manchester, and provided for the exclusion, temporary or permanent, of milk from cows with udders affected with any disease, as well as of the milk from cows affected with advanced tuberculosis.

Other corporations took the same course, but the opposition at first was concentrated on Manchester, and the clauses were materially curtailed before they reached Parliament. It was found impossible from the beginning to insert a clause providing for the slaughter of cows suffering from tuberculosis of the udder, or from advanced tuberculosis, though the necessity for this clause was clearly recognised.

It was further found necessary at a town's meeting to remove advanced tuberculosis as a condition rendering the milk of a cow unfit for human food.

The corporations applying for powers were advised by the Local Government Board that they would be much more likely to get powers from Parliament if they could agree on a common set of clauses, and Mr. Fitzgerald was requested to prepare a draft of clauses, which he did, with the aid of the Local Government Board.

The opportunity was thus presented of inserting a clause relating to the slaughter of cows, but the absence of previous authorisation was fatal to the proposal.

The common clauses were considered by the Local Government Board, the Board of Agriculture, and the Associated Chambers of Agriculture, and in their final form presented both additions to, and diminutions of, the powers asked for by the various corporations.

The clauses enacted in effect :—

1. That a cow known to be suffering from tuberculosis of the udder must be isolated (and by isolation was meant isolation on the same farm), and that the milk from such cow must not be used for human food.

2. Powers were given to inspect the cows, and to take samples of milk from particular teats, also to take samples of mixed milk produced, or sold, or intended for sale, within the city. These powers, however, can only be exercised outside the city on the production of an order of a justice having jurisdiction in the place in which the farm is situated.

3. If the Medical Officer of Health is of opinion that tuberculosis is caused, or is likely to be caused, to persons residing in his district from consumption of the milk supplied from any dairy, the dairyman may be summoned to appear before the Corporation to show cause why an order should not be made prohibiting him from supplying milk within the city.

4. A dairyman supplying milk within the city who has in his dairy any cow affected with, or suspected of, or exhibiting signs of tuberculosis of the udder, shall forthwith give written notice of the fact to the Medical Officer of Health of the district which he supplies, stating his name and address and the situation of the premises where the cow is.

Unfortunately, the penalty attaching to an offence under this section must not exceed forty shillings.

The manner in which the administration was planned out before these clauses were obtained, and in which it has still been found most convenient to administer them, is as follows :—

Inside the city the cows are systematically examined, and if any suspicious

condition of the udder is discovered by the veterinary surgeon, a sample of milk is drawn into a sterilised bottle sterilised in Professor Delépine's laboratory (full particulars being recorded), and is sent forthwith to him on the return to the office of the veterinary surgeon. If the milk is found to be tuberculous, the cowkeeper is requested to have the cow slaughtered under veterinary inspection, and does so.

With regard to the examination of the milk, I am indebted to Professor Delépine for the following account of his procedure:—

Short Statement by Professor Delépine of the Method adopted by him for the Detection of Tubercle Bacilli in Milk.

Apparatus for Collection.

Sterilised glass bottles enclosed each in a sterilised metal case are supplied by the laboratory for purposes of collection. The bottles have a capacity of eight to ten ounces, have an indiarubber stopper to which is fixed a thermometer. Inside the case is also a sterilised metal vessel, shaped like an ordinary milk measure, which must be used to take milk out of the cans. The inspector is directed not to open the metal case, or the bottle or measure, till the moment when he wants to collect a sample.

Collection of Mixed Milk.

A sample taken from a milk can in this way may be considered as a true sample, since no contamination can be introduced by the inspector.

The inspector is also directed to record the temperature of the milk at the time of collection. This is useful for several purposes, more especially to check statements as to the time of milking. The milk in the can should be stirred up at the time of collection. Mixed milk can be obtained either at the railway station, at the dairy, or at the farm, and, as the name indicates, always contains the milk, wholly or partly, of several cows.

Collection of Unmixed Milk.

Unmixed milk is collected direct from the cow by the veterinary inspector, who is directed to see, before collecting a sample, that the udder and his own hands are clean. When the operator is skilful he can milk the cow directly into the sterilised bottle, otherwise he is directed to milk the cow into the sterilised measure or case, from which it is at once transferred to the bottle.

Forwarding of Samples to the Laboratory.

The bottle is immediately tightly corked, and the case closed. If the inspector can arrange to deliver the sample at the laboratory within a few hours of the time of collection, no further precaution is needed. If the milk cannot be delivered within four hours in summer or ten hours in winter, or has to be sent by rail, the inspector is directed to place the sample in ice. Small refrigerators are supplied by the laboratory for that purpose.

Treatment of Samples on Arrival at the Laboratory.

Samples which arrive at the laboratory at the times prescribed—*i.e.*, during working hours—are examined without delay, while those which arrive too late for examination on the same day are at once placed in the refrigerator, from which they are not removed till the time for examination.

A. Preliminary Examination.

The temperature, reaction and specific gravity of the milk are taken, any abnormal appearance noted, two glass tubes containing each 40 ccs. are filled with the milk, which has been previously thoroughly mixed. In these tubes the milk is centrifugalised for fifteen minutes, the speed of the centrifugal machine being 3,000 revolutions a minute. At the end of that time the cream has separated as a thick compact stratum, so dense that the tube can be turned upside down without any fluid escaping (except in the case of very abnormal milk). A dense sediment "slime" has also separated, forming at the bottom of the tube a layer of various thicknesses and appearances.

The tubes being of uniform size, the amount of cream and of sediment are roughly estimated by actual measurements. Their characters are also noted.

The cream is then aspirated off, by means of a sterilised glass tube connected with a vacuum pump. After all the cream has been removed, the separated milk is also aspirated until there remain at the bottom of the tube only 2 ccs. of separated milk and the sediment. The sediment is so compact that the tube may then be inclined and the sediment fully exposed without being displaced. With a sterilised platinum loop about 2 milligrammes of sediment are taken and spread at once upon a cover glass. Two such preparations are made. The rest of the sediment is mixed with the 2 ccs. of separated milk left in the tube, and this mixture is used for inoculation purposes.

Microscopical Examination.

Examination for Tubercle Bacilli.—The films are fixed by heat in the usual way, then they are placed in a capsule containing a mixture of equal parts of absolute alcohol and ether, and allowed to remain in this mixture for several hours; after this the capsule is placed in hot water, so as to bring the mixture of alcohol and ether to the boiling point. After fifteen to thirty minutes the cover glasses are removed from the mixture, thoroughly washed with absolute alcohol, and stained by the Ziehl-Neelson method. Two such preparations are examined in connection with each sample of milk. It may be stated at once that in the course of five years' work, during which nearly two thousand samples of milk have been examined, there has been only one instance of an *acid-fast* bacillus giving rise to a temporary error (which was corrected by the inoculation results). In all the other cases (about one hundred) in which tubercle bacilli were discovered microscopically, typical tuberculosis was obtained by inoculation with sediments in which the tubercle bacillus had been detected microscopically. Even in the case in which the

mistake occurred, it was found, on re-examination of the specimen (after the results of the inoculation had been obtained), that the error might have been avoided, for the morphological characters of the bacillus were different from those of the tubercle bacillus. This method has been used by me since 1884, and I am convinced, after many comparative trials, that it is better than any of the other methods recommended up to this day. The microscopical method is, however, very inferior to the inoculation method for the detection of small numbers of bacilli (within a practical length of time). By the microscopical method tubercle bacilli were detected in not more than one-half of the samples which were proved by inoculation to be tuberculous.

Examination by Inoculation.

Two guinea-pigs, weighing at least eight to ten ounces, are inoculated each with the sediment of 40 ccs. of milk mixed with 2 ccs. of the separated milk. This fluid is inoculated subcutaneously on the inner side of the leg, at the level of the femoro-tibial articulation. The inoculation is made with strict aseptic precautions. When the precautions prescribed for the collection and forwarding of samples are strictly adhered to, it is exceptional for a guinea-pig to show any evidence of septic infection immediately after inoculation. (When these precautions are not adopted, over seventeen per cent. of the samples of mixed milk produce general infection which is frequently rapidly fatal. This was proved by a preliminary investigation, the results of which have been previously recorded.) When a guinea-pig has been inoculated with milk containing many tubercle bacilli, the presence of which has been recognised by the microscopic examination, typical infection of the popliteal, superficial and deep inguinal and usually of the sublumbar ganglia (on the side inoculated), can be recognised at the end of ten or fifteen days. After the animal has been killed, the presence of tubercle bacilli can be microscopically demonstrated in these glands, and usually also in the retro, hepatic ganglia and in the spleen. Even when bacilli are not numerous enough to be detected directly in the milk by the microscope (under the conditions described above), the superficial and deep inguinal ganglia usually contain tubercle bacilli at the end of fifteen days, *i.e.*, when the animal has been inoculated with milk containing a moderate number of bacilli. When the milk contains very few bacilli it may be difficult to obtain any clear evidence of infection before the end of the fourth or fifth week. It will thus be evident that whenever milk contains a material number of bacilli, it is possible, by the inoculation method, to recognise their presence within a fortnight or three weeks. For further details see S. Delépine on "The Value of Experimental Tuberculosis in Diagnosis" (*British Medical Journal*, September 23rd, 1893); "The Examination of Cows' Milk for the Detection of Pathogenic Properties" (*Journal of Comparative Pathology and Therapeutics*, 1897).

With regard to milk containing an extremely small number of bacilli, it is clear that the presence of these bacilli can only be detected by using more than 40 ccs. of milk to apply the test.

It is, however, obvious that if a young guinea-pig, which is an animal very susceptible to tuberculosis, is not infected by bacilli obtained from about one-third of its own weight of milk when these bacilli are injected under its skin, a child would not probably be infected by a quantity of milk proportionally smaller and administered by the alimentary canal.

I am, therefore, of opinion that, although the inoculation test as applied by me does not warrant the assumption that all samples of milk which do not give tuberculosis are absolutely free from tubercle bacilli, yet when no tuberculous infection is produced it can be safely assumed either that there are no bacilli or that the bacilli are so few that they may be disregarded from an administrative point of view.

Controls.

In the course of my work I have taken every possible opportunity to control my results by the post-mortem examination of the udders of cows, the milk of which had been found to be tuberculous or free from tuberculosis by the methods above described.

In all cases in which tubercle bacilli had been discovered in the milk the mammary lymphatic gland was found tuberculous, and in all cases but one I have found some tuberculous lesion of the mammary gland itself. In the one exception there was interstitial mammitis of the same type as that found in typically tuberculous udders, but no typical histological tubercle or tubercle bacilli could be found. The mammary lymphatic gland was, however, affected with tuberculosis. The most frequent tuberculous lesion found in the udder was an interstitial mammitis, causing great increase of fibrous tissue and atrophy or destruction of glandular acini and ducts, typical tubercles being present only here and there. In a smaller group numerous typical miliary tubercles were found associated with patches of interstitial mammitis. In a still smaller group cheesy tubercles, some forming large groups, were found. These were also associated with interstitial mammitis. In some cases submucous tubercles, causing ulceration of the mucous membrane of the ducts, were found.

Complete statistics of the results obtained have not yet been prepared, but the above statement is based on the examination of about forty tuberculous udders. On the other hand, some twenty udders which had not yielded tuberculous milk, although the cow was tuberculous, have been examined, and in no case was there any evidence of tuberculous lesions. It should be added that only a small proportion of the cows of which the milk was examined had previously been tested with tuberculin; all the cows so tested and which yielded tuberculous milk also reacted positively to tuberculin.

Pseudo-Tuberculosis.

Attention has naturally been paid to pseudo-tuberculosis in connection with this work. It is sufficient to state here that when the methods just described are carried out carefully, it should be impossible to mistake pseudo-tuberculosis for tuberculosis vera.

It will be seen that the methods of examination usually entail waiting a month till the result of the inoculation test is obtained. But in all cases with suspicious characters the cowkeeper is informed of the views of the veterinary surgeon.

In the case of farms outside the city samples of mixed milk are taken from cans as they arrive at the railway stations or from milk-carts, and are submitted to Professor Delépine for examination. Should he declare a sample tuberculous an order is obtained from a justice having jurisdiction in the place where the farm is situate, empowering the Medical Officer of Health, or his deputy, accompanied by the veterinary surgeon of the Corporation, to visit the farm, inspect the cows, and take samples of milk from suspected udders.

These samples are then sent to Professor Delépine for examination, and it is upon this examination that the diagnosis of tuberculosis of the udder is decided.

The farmer is then required to isolate the affected cow, but is advised by the Medical Officer of Health, in writing, to have her forthwith slaughtered in the presence of the veterinary surgeon of the Corporation. How far this has been successful, how far unsuccessful, will be seen by the details shown in the statement of the veterinary surgeon. In all cases the cow has been disposed of, but the manner in which this has been effected clearly indicates the necessity for a clause requiring that the affected cow shall be slaughtered under supervision.

It will be noted that the detection of the tuberculous milk in the first instance, and the final diagnosis of the tuberculous udder, rest with the bacteriologist, and it might be supposed that the part of the veterinary surgeon is a somewhat subordinate one. This is by no means the case. The whole of the administration of these clauses, as carried out in Manchester, rests upon the assumption that, given a mixed milk proved to be tuberculous, there must be amongst the cows producing it one or more affected with tuberculosis of the udder.

Exception might be taken to this assumption on these grounds:—

1. That the milk may be contaminated by a consumptive person or otherwise in transit.
2. That it might be contaminated by tuberculous dust or dirt in the cowshed, or by fouling of the udders with infected excreta, without lesion of the udders.
3. That the milk might be infected by the presence in the cow of a generalised tuberculosis without the udder being affected.

With regard to 1, it is an almost inconceivable occurrence with a covered can, and all cans are covered, and should be locked; 2, is a possibility in a highly-infected cowshed, especially after it has been recently swept, or if cows are suffering from tuberculous disease of the intestines, but under ordinary conditions there would not from this cause be a sufficient number of bacilli to infect the milk to the extent determined by Professor Delépine; 3, may occur as a pathological rarity, but even then infection of the udder would have started. On the other hand, it does not follow that an udder which has been invaded

tuberculosis to an extent sufficient to yield an infected mixed milk shall esent any lesions to clinical examination. Of this we were well aware ore the Milk Clauses came into operation.

In one such instance where I persuaded the cowkeeper to have his cows d with tuberculin, the udder of one cow gave a very marked local reaction, ving the presence of disease, though no morbid condition was found on cal examination. On this fact, and on the well-known effect of tuberculin ocal lesions, especially those of tuberculosis, was based our proposed use ne tuberculin test to determine, in advanced cases of tuberculosis, the ndition of udders yielding no local signs. A reaction being obtained, it ll remains necessary to examine the milk from the tuberculous udder to see hether it is tuberculous.

The objection, then, urged against inferring from a tuberculous mixed the fact of one or more tuberculous udders being concerned in its tion, is, scientifically, of little value, and from the point of view of istration, of none at all.

e fact that a mixed milk is tuberculous only serves to guide us in going a particular farm, and if any flaw existed in our assumption this would n only that the veterinary surgeon would not in all cases find tuberculous ers corresponding to the tuberculous mixed milk.

Moreover, it has been quite clear, both to our veterinary surgeon and elf, that the power of detecting suspicious conditions in the udder is one ch admits of considerable extension by practice, even in skilled hands, and s in this difficult task that the important *rôle* of the veterinary surgeon lies. I am quite satisfied, from the udders which have been brought by Mr. Lloyd from slaughtered cows, that definite lesions are often so diffuse as to be most difficult of detection. Hence, when he states that he has seen three instances in which lesions, previously undetectable in udders yielding tuberculous milk, make their appearance during the continuance of his observations, I am prepared to accept the conclusion that the udder may be in a pathological condition not to be discovered merely by manipulation, but quite adequate to produce in the milk large numbers of bacilli. As a result of following up forty-seven tuberculous milks, he has found udders which were proved, by subsequent examination of the milk, to be tuberculous in thirty-one instances.

In fifteen instances a tuberculous udder has not been found. In one instance the result is not yet determined.

In some cases the affected cows would appear to have been removed between the taking of the mixed sample, and the subsequent visit of the veterinary surgeon to the farm. This might well happen, and by no means accidentally, but as a result of the milk being under examination. It is, therefore, highly satisfactory to find that in so high a proportion of cases the tuberculous udders have been traced. Such a result sufficiently proves our position that, given the mixed milk tuberculous, it is safe for all practical purposes to infer a tuberculous udder producing it.

At the same time, such a source of error and of misconduct need not exist. It would suffice to check it if all restriction on the inspection of

outside farms were removed, and if an additional veterinary surgeon were appointed to carry on such direct inspection.

In case no tuberculous udder is found, it suffices to subject the mixed milk to two or three further tests to determine whether this is due to an obscure udder condition or to some other cause. If it is due to obscurity of the diseased state of the udder, the mixed milk will continue to be tuberculous.

In some cases the condition of the atmosphere of the cowshed and the udders of the cows should be tested in regard of their power to infect the milk under existing and under possible conditions. This I propose to have done, if possible.

The order section of the Milk Clauses has not been used in Manchester, except in one instance, where a cowshed was grossly overcrowded and incurably dirty. Yet this section gives very extensive powers, and, possibly, it is owing to the fact that it may be used that no one has attempted to send milk from a condemned cow.

It is quite a conceivable policy to rely on the order section alone, and not to send a veterinary surgeon to the farm, throwing on the farmer the onus of determining how his milk has become infected and of showing that he had taken effectual steps to stop the production of tuberculous milk.

Were such a policy adopted, the farmer would be obliged to call in a veterinary surgeon at his own expense, who would give him a certificate that he had taken the steps required by the clauses. The Corporation would then satisfy themselves that the mixed milk from such dairy no longer contained tubercle bacilli, and would doubtless refrain from making the order.

The disadvantage of such a course would be that the sanitary authority would know nothing of the conditions under which milk was being produced, and it would also be a great hardship on the farmer to take this course.

In the case of a dairy receiving and mixing milks from a number of farms this is the only course which could be adopted.

It is quite evident that the order section would be most valuable in the case of persistent infection in a mixed milk when from one or another cause the source of the infection could not be ascertained. But we have had no such cases.

The clause requiring notification of suspicious conditions of the udder by farmers has been practically inoperative, directly. These conditions are not notified and the penalty is inadequate. But indirectly it has been of some service. When an udder has been shown to be tuberculous and a ready compliance is made with the request of the Medical Officer of Health for the slaughter of the diseased cow in the presence of the veterinary surgeon, no further action has been taken. But if the cow is removed, so that it cannot be satisfactorily traced, and if the udder has been such that notification ought to have been given, a prosecution ensues. In this roundabout manner some control is exercised over the disposal of the cow. But the penalty is inadequate, and a cow affected with tuberculosis of the udder should be forthwith slaughtered, under proper inspection, with a heavy penalty attached in case of evasion.

I have indicated how these clauses have been carried out, and how they

might be more severely administered, and the question presents itself whether their administration has been attended with a marked diminution in tuberculosis of the udder.

If one might judge from the ferment which these clauses have excited, one would expect that a considerable and steady diminution would have occurred. The diminution has been considerable, but it has by no means been constant.

Of the mixed milks from 401 farms taken under the Milk Clauses forty-seven have proved tuberculous, or 11·7 per cent. Of 108 samples taken at railway stations before the Milk Clauses came into operation, twenty, or 18·5 per cent., were tuberculous. There has thus been an improvement in the milk samples taken at railway stations to the extent of 7 per cent., but the proportion of tuberculous udders has fluctuated considerably.

It may be, however, that farmers supplying Manchester with milk will in future take additional precautions, and that a further improvement is only delayed.

It was never anticipated that by these clauses tubercle bacilli would be altogether excluded from the milk supply. The fountain of tuberculous udders remains behind in the tuberculous cows and in the dark, badly ventilated and crowded cowsheds. What was hoped, however, was that a substantial proportion of infection would be intercepted, and that the irritation generated by the discovery of tuberculous infection in the milks as they arrive in the city would turn the attention of farmers to the necessity of protecting themselves, either by systematic veterinary inspection and greater cleanliness, or by getting the tuberculin test used towards the total eradication of tuberculosis.

It may be that we are in too much haste to gather our fruit, but I must admit that I begin to doubt whether the operation of the Milk Clauses is adequate to the entire result expected. On the other hand, one cannot but feel some degree of sympathy with farmers in hesitating to go in for entire eradication of tuberculosis, until at all events the necessary conditions are clearly understood by them. It is not sufficient to extirpate tuberculosis from a herd, as determined by the most careful application of the tuberculin test; as much care is requisite in the complete disinfection of the cowsheds, so that the herd should always be purified in summer in the first instance. It is also requisite that the cows should have adequate housing, and that the cowsheds should be at all times kept thoroughly clean. It is difficult to provide a feeding passage and fulfil the latter condition with less than 700 cubic feet of space in a cowshed with one row of cows, unless the cows are stalled two and two, when 600 cubic feet may be just made to suffice. But double stalls are a bad arrangement.

Cows must be adequately fed. We have evidence that inadequate feeding greatly aids the spread of tuberculosis. Inadequate feeding is otherwise unprofitable, and is often due to want of knowledge.

It is well worth considering whether a herd newly purified from tuberculosis should not be turned into a grazing field not recently used.

Wonderful as are the results of the tuberculin test, it is not infallible, even when applied legitimately; and, supposing one or two tuberculous cows introduced into a herd housed in dark, crowded, badly-ventilated and dirty

cowsheds, the disease will spread, or else the whole of our conceptions regarding the propagation of tuberculosis are erroneous.

If, however, the cows and cowsheds are kept rigidly clean, an odd tuberculous cow should not matter much. But this condition cannot be fulfilled with many of our existing cowsheds, and, if it could, it is difficult to convey to the farm labourer a sense of its supreme importance. Nevertheless, until we are ready to adopt the measures requisite for the complete eradication of tuberculosis from dairy cattle, I agree with Professor Delépine that we shall not cease to have a certain proportion of tuberculous milks. Meantime we are content to wait for a year or two until we see how far the Milk Clauses will assist us. I would, however, urge these points:—

1. Cows shown to suffer from tuberculosis of the udder should be required by law to be forthwith slaughtered in the presence of the veterinary surgeon employed under the Milk Clauses.

2. All restrictions on the inspection of herds supplying the district with milk should be removed.

3. A heavy penalty should be attached to failure to notify suspicious conditions of the udder.

THE VETERINARY WORK DONE UNDER THE MILK CLAUSES IN MANCHESTER, AND THE DIFFICULTIES MET WITH.

STATEMENT BY J. S. LLOYD, M.R.C.V.S., *late Veterinary Surgeon to the Sanitary Committee, City of Manchester; now Veterinary Inspector for the City of Sheffield.*

BETWEEN the dates January 11th, 1900, and April 30th, 1901, the number of farms from which samples of mixed milk have been taken at the Manchester railway stations or *en route* to the city has been 401. Of these 401, 259 are situate in Cheshire, and from forty-two of these = 16·21% tuberculous milk has been sent to Manchester; forty-one are situate in Staffordshire, from one of which = 2·44% tuberculous milk has been sent to Manchester; 93 are situate in Derbyshire, from four of which = 4·3% tuberculous milk has been sent to Manchester; whilst three are situate in Salop and five in Lancashire, all of which were free from tuberculous infection. From figures supplied by the farmers themselves to the Public Health Office, the estimated number of cows kept at these 401 farms is 8,408, or an average of nearly twenty-one cows per farm.

The total number of farms from which tuberculous samples have been sent is 47 = 11·72%. At thirty-one of these forty-seven farms thirty-five cows with tuberculous udders have been found. At fifteen of the farms no cows having diseased udders could be found, and subsequent control samples of the mixed milk from these farms have all been reported free from infection, after

being tested by Professor Delépine. At most of these farms the owners have admitted selling cows from the farms between the date of the taking of the mixed sample at the station and the date of the visit of the veterinary surgeon, but only in two or three instances have the owners admitted that the cows sold were diseased, and in only one case has a farmer admitted that the cow had a diseased udder. In three of these instances the farmers stated that they also sent the milk from a neighbour's cows together with the milk from their own cows, and in two cases these were followed up, but with negative results. At the remaining one of the forty-seven farms samples of the milk from suspicious cows are still in process of examination.

To give the percentage of cows having tuberculous udders among the cows represented on the 401 farms from which the mixed milk sent into Manchester was tested, it will be necessary to strike out the fifteen farms at which no cows with tuberculous udders could be found, and also the one farm from which the milk from suspicious cows is still under investigation. The average number of cows will then be represented by $\frac{31}{47}$ of 8,408 = 5,545, which, taking thirty-five cows at the thirty-one farms, gives a percentage of 0·63.

The total number of cows clinically examined as the result of following tuberculous samples of mixed milk is 1,308, but the number of cows examined irrespective of previous samples of mixed milk is 4,031. Of these 2,182 were examined in the Manchester cowsheds, and among them eight cows were found to have tuberculous udders. This gives a percentage of 0·36. The remaining 1,849 cows were examined in cowsheds outside Manchester, and among them nine were found to have tuberculous udders, equal to a percentage of 0·48. If we add up the number of cows thus, 5,545 + 2,182 + 1,849, we have a grand total of 9,576 cows the milk from which was tested for tuberculosis, or among which cows with tuberculous udders were found by clinical examination; and by adding up the figures 35 + 8 + 9 we have a total of fifty-two such cows having tuberculous udders, which is equal to an average percentage of 0·54.

According to the agricultural returns for 1900 the number of cows and heifers in milk or in calf in England was 1,899,623. If we take 0·54% of these to have tuberculous udders we have a total for England of 10,257. Or if we take the figures for Great Britain on the same basis, viz., 2,620,901 at 0·54%, we have a total of 14,152 with tuberculous udders.

For administrative purposes the statistics will show a much lower proportion of tuberculous cows, viz., thirty-five out of 8,408, or 0·4%.

Regarding the disposal of the fifty-two cows mentioned, the particulars ascertained are as follows. Of the eight city cows having tuberculous udders, two are isolated and are still in the possession of their owners, who have promised to ultimately slaughter them in the presence of the veterinary surgeon. The remaining six have been slaughtered at the Water Street abattoirs; three of the carcases were passed as fit for human food, and three were condemned as quite unfit, and were destroyed. Of the nine cows found outside the city, irrespective of previous tuberculous mixed samples, five have

been slaughtered, one of the carcases being passed as fit for human food; the other four, being totally unfit, were destroyed or buried. The remaining four of these nine cows were disposed of by the owners and could not be traced. Of the thirty-five cows with tuberculous udders found by following up tuberculous samples of mixed milk, fifteen have been slaughtered, three of which have been passed as fit for human food, two as partially fit, the unfit parts being destroyed; ten have been condemned as unfit, four of which went to the knacker's yard, five were buried, and a portion of the other was subsequently discovered to have been sent into Manchester for human food. Of the remaining twenty of the thirty-five, seven are stated to have been fed and sold for slaughter, seven have been disposed of but have not been traced, and six are still in the possession of their owners. Four of these owners have promised to ultimately have their cows slaughtered in the presence of the veterinary surgeon. Thus out of these fifty-two cows with tuberculous udders only twenty-six have been definitely proved to have been slaughtered; the remainder, due to the absence of any compulsory power to deal with them, are either still in the possession of the farmers or have been sold by the latter, some it may be for slaughter, others probably to milk elsewhere. At any rate, nothing definite or trustworthy can be ascertained as to their ultimate disposal.

It will thus be seen that against the successful working of the Milk Clauses certain difficulties have been found to arise, and I will now proceed to deal with each one shortly:—

(1) The first one is where, on following up a tuberculous station (mixed) sample of milk to the farm, no cow is found exhibiting signs suspicious of tuberculosis.

(*a*) In several instances where this has been the case the farmer has admitted selling cows from his farm between the date of inspection and the date of taking the sample. But, although in a few cases he has admitted that he had sold a diseased cow or a cow which he states has not been doing well, he has only in one instance admitted selling a cow which he knew to have a diseased udder.

(*b*) Another possible difficulty which has been met with is where the farmer also sells milk from his neighbour's cows mixed with the milk from his own cows. In a few cases this has come under my notice. In one, I failed to follow this up, but in the remainder, when followed up, I failed in each instance to discover a cow with a tuberculous udder. Still it is quite possible that contamination could be produced in that way.

(*c*) Another reason for tuberculous infection in milk, and one which has been brought to the notice of the Council of the Royal Agricultural Society of England, is external and accidental contamination. It is possible, perhaps, that a consumptive herdsman or railway porter might infect the milk, but I think it is not probable, and the committee appointed to consider the question by the Royal Agricultural Society of England did not attach any weight to this point. Another external source of contamination has been considered by Dr. Niven, and that is contamination by dirt in the cowshed. When we

consider the dirty condition of some cowsheds and cows, together with the fact that one of the cows may be suffering from tubercular muco-enteritis, it is quite conceivable that the dirt on the cow's udder may convey to the milk the bacilli given off in the discharge from the bowels of the diseased cow, or, it may be, from the matter coughed up by a cow suffering from pulmonary tuberculosis. Still, in these latter cases the presence of the diseased cow in the herd should not escape the notice of an observant veterinary surgeon.

In all cases (nineteen) where I have been unable to find the cow with the diseased udder at my first visit to the farm, a control sample of the mixed milk from the cows on the farm has been taken for a second bacteriological examination by Professor Delépine. In fifteen of these cases the milk was reported as being incapable of producing tuberculosis, whilst in four instances the milk was still found to be infected, thus proving that the source of infection was still present. In these cases I again visited the farm, and in three cases, after a very lengthy examination, both previous to and after having the whole herd milked, I have discovered a cow showing slight signs of disease about the udder, but in no one were the symptoms at all typical of tuberculosis. In each instance, however, a sample of milk from these cows was found when examined by Professor Delépine to contain tubercular infection and to be capable of producing disease in test animals. The milk from suspicious cows on the other farm is still under investigation. That brings to notice another reason why the cow with a diseased udder may not be found on the first visit of the veterinary surgeon to the farm, namely, the

(*d*) Difficulty of Diagnosis.

Several authorities, including, I think, Prof. Bang, have stated that a tuberculous cow can give tuberculous milk without having tuberculous disease of the udder. That is not my opinion. I can quite conceive that a cow with an udder apparently free from tuberculous disease can give tuberculous milk, but my experience with several such cows is that, if the cows are kept under observation for a short time—one to three months—it will be found that the symptoms of the disease in the udder of the implicated cow will begin to be manifest. That has been my experience in other cases besides the above three. In one case I took a sample of milk from a cow suffering from chronic pulmonary tuberculosis, the udder at the same time appearing healthy. That sample was examined by Prof. Delépine, and he reported that it had caused tuberculosis in test animals. The cow was again examined by me in five weeks after the first examination, when I detected a slight atrophy of one hind quarter, together with very slight induration of the same quarter. After a consultation with Dr. Niven and Prof. Delépine I again examined the cow in a fortnight, when the induration was a little more pronounced. I then took a separate sample of the milk from each teat, and these samples were examined by Professor Delépine. He reported that the milk from the suspicious quarter only had caused tuberculosis in test animals. I have also examined the udder of this cow on a subsequent occasion, when I found the diseased quarter of the udder had become equal in size to the opposite healthy quarter.

In another case I have obtained tuberculous milk from a "wasting" cow, but in this instance after the cow was milked a very slight hypertrophy of one half of the udder could be found, but only by very careful manipulation and visual examination. In several other cases I was only able to find the suspicious udder after the animal had been almost completely milked.

The conditions and symptoms met with in cows suffering from tuberculosis of the udder differ very considerably, both *ante* and *post mortem*. In addition to the obscure cases just mentioned, the symptoms presented in fairly well-marked cases differ very widely during life. For instance, I have met with a tuberculous udder in a two-year-old heifer, and several in four-year-olds, although the majority were in aged cows. Again, the bodily condition of the cow is no criterion, as I have discovered tuberculous udders in fat cows as well as in cows in fair condition and in "wasters." The condition of, or symptoms presented by, the diseased udder itself I have also found to vary considerably. As a rule the disease is most frequently manifest in one or both of the hind quarters of the udder, occasionally I have found it in the fore quarters, and in several instances both quarters of the same side have been affected. In one case I found the disease very well marked in the right hind quarter and the left fore quarter, whilst the other two quarters were apparently free from the disease. Again, the diseased portion of the udder is generally hypertrophied, but in several instances I have found well-marked, really typical cases, where a diseased quarter has been atrophied, and where the secretory powers of the organ were to a greater or less extent destroyed, the milk being in most of these instances small in quantity and changed in appearance, the latter varying from thin normal-coloured milk to a muddy-coloured liquid, and in a couple of instances to an amber-coloured serum. In all of those atrophied quarters the gland structure had been replaced by a hard tubercular deposit, and they were also associated with the disease in at least one other quarter of the udder. In the amber-coloured serum mentioned above, Professor Delépine found tubercle bacilli by microscropic examination.

In all cases of tuberculosis of the udder that I have met with, I have been able to find some amount of hardening or induration. The amount has been very variable, as has been also the position, or portion of the quarter affected. As a rule the supra-posterior portion of the hind quarter has been the seat of this induration; in most cases it has been fairly superficial, whilst in a few it has been deeper seated, and in two or three instances I have found a small indurated mass only near the base of one of the hind teats, and placed either inward or forward to the ampulla of the teat. In the three instances where I was unable to find the cow with a diseased udder at my first visit to the farm I did not notice this induration, except at the second visit, and from this fact I conclude that this induration is subsequent by some weeks to the invasion of the udder by the tubercle bacilli, but that the milk from such an udder is infective before any sign can be detected, so as to contaminate the milk from an entire herd. In prosecutions under the Milk Clauses for failure to notify tuberculous udders, the question is usually asked by the defence as to the probability of the defendant knowing that his cow exhibited symptoms

suspicious of tuberculosis of the udder. It is possible from the character of the induration to say if it has been of some standing. In more recent cases of tubercular invasion of the udder, however, the nodular character of the induration is not so marked; it may appear of a granular character to a practised hand, often it is very diffuse, and if accompanied in that stage by little or no hypertrophy it is then easily confounded with what is termed a "fleshy udder." In these latter cases a milk-seller could hardly be expected to suspect tuberculosis, and particularly, as is often the case, when the cow seems otherwise a healthy beast. But in these cases also he will often detect some change, and in order to protect himself he should seek the advice of his veterinary surgeon or notify the case to the proper authority, and so keep himself within the law.

Although the disease is usually chronic and unaccompanied by any acute symptoms, I have, in several instances, met with cases where the disease has suddenly become acute, and from an old-standing disease in one quarter suddenly attacked the whole organ. In one case where a cow with a tuberculous udder has been isolated since January last, I noticed, on a recent visit (May 7th), that, although the cow had calved in the meantime, I could detect practically no alteration in the diseased quarter of the udder from what I had noticed when examined in December.

There is still one other form in which I have found two cows suffering from tuberculosis of the udder, and that is where the udders were the seat of catarrhal mastitis of a tubercular nature, and in the pus from which Professor Delépine found tubercle bacilli by microscopic examination. It should be added that other samples of a like nature were examined with a negative result.

Before passing on to shortly note several conditions of the udder which may be confounded with tuberculosis, I may point out that in all cases where I have found cows with tuberculous udders the diseased animals had all been in the possession of their respective owners for some considerable time, many of the country cows having been reared by the owners.

A very common condition met with in milking cows, particularly what may be called tied-up or stall-fed cows, is atrophy of one half of the udder, caused by continually lying upon one side only. The pressure of the cow's body forces the milk from the side of the udder next the ground, and the gland gradually becomes, to a variable extent, atrophied. This often gives the opposite half of the udder an enlarged appearance. A true hypertrophy of one part of the udder also follows a case of mammitis, where one or more quarters lose their functional activity, constituting lost quarters, and the other healthy quarters take on compensatory action, and become hypertrophied. When these lost quarters waste completely away, they are of no moment, except to depreciate the market value of the cow; but, when the lost quarter is replaced by an indurated mass, as I have pointed out before, there is a possibility that they are tubercular in that case; but then, in my experience, they have been accompanied by tuberculosis in one or more of the other quarters of the udder. Abnormal, but not pathological, hypertrophy of one

or more quarters is also sometimes met with in milking cows, and especially is this so when supernumerary teats are present. But in all such cases, if the hypertrophy is of a non-tuberculous origin, there has been an absence of chronic induration (with the exception of one, which I will shortly describe), and the milk from the hypertrophied quarters of the udder has been non-infective when tested by inoculation into test animals.

In all doubtful cases I have no hesitation in stating that I believe the inoculation test, as carried out in Manchester, to be absolutely infallible, and that it is as delicate as it is true, as proved in several cases to my knowledge where it has demonstrated tubercular infection, in both mixed milk and milk from special cows, several weeks before the symptoms of the disease in the infected cows' udders became manifest.

The one condition of chronic induration which I have just mentioned is that caused by chronic interstitial mammitis. This affection of the udder is often a result of acute mammitis, but, according to the late Professor Walley, it may be interstitial in its character throughout. Owing to the amount of interstitial tissue formed, the affected udder becomes indurated, and often markedly hypertrophied. At the same time, the secretory power of the glandular tissue is destroyed, and the milk secreted gradually becomes less, and finally stops. Such a case I have had under observation for some time, and a short account of it will, I think, be interesting.

The subject is a Galloway cow, about six years old, and was first seen by me in October last. The animal had then been bought about a fortnight as a fresh calver. The right hind quarter was a little hypertrophied and considerably indurated. I considered the case very suspicious, and took a sample of the cow's milk. This was examined by Professor Delépine, and he reported that it had failed to cause tuberculosis in test animals. I again examined the cow at the end of November, when the condition of the udder was not materially changed, and took another sample of her milk, which was also reported negative by Professor Delépine. Early in January I again examined this cow's udder, when I noticed that the induration seemed to be of a corded character, something like the feeling under the skin of an animal's trachea. With the owner's consent I tested the cow with tuberculin, when the animal passed the test. Samples of her milk were taken just previous to testing, and again twelve hours later, also with a negative result. Just previous to testing, the owner informed me that the cow was not giving so much milk from the indurated quarter as from the others—at first no diminution was noticed. The quarter gradually became harder and more corded in character, at the same time that the quantity of milk secreted became less, and the quarter ultimately became dry.

The second difficulty met with in working the Milk Clauses is the failure on the part of the farmers and cowkeepers to notify to the Medical Officer of Health the presence in their dairy of a cow "affected with, or suspected of, or exhibiting signs of tuberculosis of the udder," as required by sub-section 4.

The third difficulty which has arisen in connection with the working of the Milk Clauses in Manchester is due to the absence from the Milk

Clauses of any specific powers for dealing with cows suffering from tuberculosis of the udder after they have been found, and the tuberculous nature of the disease in their udders has been definitely proved.

The procedure adopted by the Medical Officer of Health in Manchester has been to advise immediate slaughter of cows which have been definitely proved to have tuberculous udders. In exactly half of the fifty-two cows found to have diseased udders, twenty-six, this has been carried out. Six of the eight cows found in the city have been slaughtered at the Water Street abattoirs. The carcases of these have been inspected by Mr. Holburn, the chief meat inspector, by whom three were passed as fit for human food, and three were condemned as being unfit. The remaining twenty cows were slaughtered at different places in the country, either in my presence or that of Mr. Holburn. When the carcases were inspected six were passed as fit for human food, and fourteen were condemned as being unfit. It may be noted that in several of these cases the animals were so far advanced with disease that the owners recognised the futility of trying to fatten them for the butcher, otherwise they would doubtless have been less easily advised to accede to immediate slaughter.

The post-mortem conditions met with in the carcases of these cows which have been slaughtered have been almost as variable as the symptoms and conditions exhibited during life. Whereas nine out of the twenty-six slaughtered have been fit for human food, seventeen have been totally unfit. In most of the latter carcases the diseased conditions found have been very extensive, involving, in addition to the udder and the mammary lymphatic glands, most of the viscera and lymphatic glands, and in many cases tubercular lesions, varying in age and extent, have been found on the serous membranes. In a few cases large patches of tuberculous ulceration have been found on the mucous membrane of the intestines. In other carcases which were unfit for food the disease was not so extensive, but in these cases the carcases were thin and wasted, so much so that the owners did not have the carcases prepared for sale, but before slaughter decided either to bury them or send them to the knacker's yard.

In two or three of the carcases which were fit for human food, not only were they well nourished, but, excepting the udder and its lymphatic glands, very little tubercular lesions were present; the carcases being sold for from eight to twelve pounds. In all these cases, however, caseous deposits could be found in the mesenteric glands, although in one or two instances it required a careful examination of several of the glands in order to demonstrate the presence of the disease to the naked eye. In all cases of tuberculous udder the mammary lymphatic glands are found hypertrophied, but in many of the cases no tubercular deposits are visible by macroscopical examination, and it is only in animals that are thin, and where these glands are much enlarged, that the condition can be detected during life.

Regarding the disposal of the remaining twenty-six cows, matters have not been at all satisfactory. Seven of the owners elected to isolate their cows with tuberculous udders, stop selling their milk, gradually dry off and fatten

them for slaughter. When the animals are not far advanced with disease, this can, no doubt, be done to advantage; but in the interests of the public health these cows should not be sold except for slaughter and under adequate veterinary inspection. Where the carcase fulfils the conditions suggested by the Royal Commission on Tuberculosis and recommended by the Local Government Board, there is no reason why such a carcase should be condemned, although it must be borne in mind that a cow with a tuberculous udder is in the majority of cases rather far advanced with disease, and the longer she is kept for feeding purposes the more advanced the disease will become, and the less likely the carcase will be fit for human food. In all of these seven instances the owners were asked by the Medical Officer of Health to inform him when they disposed of their diseased cows for slaughter, so that the killing of the animals could be verified and the carcases inspected, but in no instance was this information given, although several gave a promise to do so.

In eleven instances the diseased cows were removed from the farms by their respective owners and could not be traced. Several of these cows were removed soon after my visit to the farms, and after the diseased or suspicious condition of the cows' udders had been pointed out. In other cases the cows were removed as soon as the owners received the letter from the Medical Officer of Health advising that the diseased cows should be slaughtered. In several of these cases no information regarding the disposal of the cow could be obtained, in others the owners wrote stating that the cows were sold for slaughter. In not one of such instances could the actual slaughter of the cow be verified, and in some of them it was afterwards ascertained that the buyers had sold the cows again in open market. It will thus be seen that eighteen of these cows with tuberculous udders have been lost sight of; and as some of them were in calf, it is quite probable that they may be giving diseased milk somewhere, possibly to be consumed in Manchester.

Eight of the twenty-six cows are still in the possession of their owners; two of these are city cows, and six belong to farmers in the country. The owners of all these have given either written or verbal promises to notify the Medical Officer of Health as to the time when they dispose of these cows, so that their slaughter can be witnessed and the carcases inspected.

SIR EDMUND VERNEY, BT. (Winslow): May I ask a question on Mr. Lloyd's paper? He states that out of twenty-six cows seventeen were badly diseased, and were totally unfit for human food. What constitutes a cow being totally unfit for human food? In what form would the tuberculosis in the cow be in order to make it unfit for human food? Because one might have supposed that with proper cooking even the most tuberculous cow was perfectly fit for human food.

MR. J. S. LLOYD: The examination of the carcases in these cases was carried out on the lines recommended by the Local Government Board in their circular letter of March, 1899. The cows fulfilled the condition laid

down in that circular, which was also recommended by the last Royal Commission on Tuberculosis as being sufficient to justify the condemnation of the whole carcase.

THE PRESIDENT: I may observe that the circular of the Local Government Board which has just been referred to embodied the recommendations of the Royal Commission, which were arrived at with a view of indicating a practical standard of fitness and unfitness of meat for food. If a carcase showed generalised tuberculosis, we considered, and I fancy most medical men considered, it was totally unfit for human food.

DR. NIVEN: From the paper which has just been read by Mr. Lloyd you will have perceived that when tuberculous milk has been traced, and the tuberculous cow or the cow with the tuberculous udder has been found, the Milk Clauses which we possess do not enable us to do more than require the cow to be isolated. The result of that is that these cows are sold without our knowledge, and may again appear amongst dairy stock for all that we know. I beg, therefore, to move this Resolution: "That power be given by Government to have such cows, that is to say, cows with tuberculous udders and yielding tuberculous milk, slaughtered under veterinary inspection." ("What about compensation?") I do not think we could discuss such a question as that just now. Personally, I do not object to compensation if any mistake has been made, but as it is a somewhat long question, I do not think we could enter into it now; but I affirm the principle that those cows ought not to be lost sight of under such conditions that they can again pass into dairy stock; that they ought to be slaughtered, and that legal powers should be given for the slaughter of those cows.

DR. VACHER (Cheshire): I have much pleasure in seconding that Resolution. I have had some experience with cows of that character, and we have felt that we have no power to compel the farmer to have them slaughtered.

DR. EASTON (Fulham): I beg to move that you add to the Resolution, "subject to compensation." As diseased cows with diseased udders are very limited in number, it is essential that they should be slaughtered, and should be prevented from being sold or lost sight of. At the same time it does appear to me rather hard that the owners of those cows, who may not have known that they had disease of the udder, should not be compensated. The section which is meeting at Marlborough Hall, and which is dealing almost exclusively with cattle, has already passed a Resolution embodying the necessity of giving compensation for the slaughtering of tuberculous animals. In this particular case, where we are not speaking of tuberculous cows, but simply of cows with tuberculous udders, which does not arise in one case in a hundred, I think Dr. Niven would be wise in admitting compensation.

DR. HOPE (Liverpool): May I point out that the Resolution implies cows

in which tuberculous disease of the udder has been discovered. The owner, therefore, cannot plead ignorance.

SIR EDMUND VERNEY: Why not?

DR. HOPE: The object of the Resolution is to prevent the sale of the cow the milk from which has been proved to be tuberculous. The owner of it, if it has been proved to be tubercular, would not be ignorant of the fact. He would be one of the first to be informed that it was tubercular.

A DELEGATE: No one would know that there was any disease of the udder until it had been discovered. The last speaker seems to have overlooked the fact implied in previous speeches—that a farmer, like a veterinary examiner, would be equally ignorant of the fact that it was diseased until either had discovered it.

DR. HODGSON (Cheshire): I think the question of compensation is not within the range of the paper to which we have just listened. The subject of compensation should be discussed by other associations. It is a political question probably, and not a scientific one. The question before us, I submit, is whether a carcase is fit or unfit to be allowed to go at large, and not a question as to whether or not anybody should be compensated. Let us deal with the practical, scientific, and humanitarian issues. In Cheshire we can point to a case where, though the cow was known to be giving tuberculous milk, and though the most competent veterinary surgeons went to examine that cow, knowing that it was giving tuberculous milk, they were absolutely unable to find any diseased udder, and it was utterly impossible by any clinical examination to find out that the udder was diseased. I am asked, How did they know it was giving milk containing the tubercle bacillus? In reply I would say, Because it had been found to contain the tubercle bacillus by bacteriological examination. But I submit that the question of compensation is outside the range of the Resolution which we are considering, and which I hope will be passed by the meeting.

THE PRESIDENT: I do not want to take part in the discussion, because my position ought to be one of complete impartiality; but there is an interest in the country which is not so fully represented in the room as other interests, and one in which personally I take a deep interest; in fact, I may say I owe my livelihood to it—viz., the agricultural interest. A great deal has been said during this Congress as regards the necessity of carrying public opinion with you. A large section of the opinion concerned in the question now before us is agricultural opinion, and I would ask you, ladies and gentlemen, to remember that it is of the utmost importance that in any step you take you should carry that opinion with you. There exists, I am aware, at the present moment, and has existed ever since this question of bovine tuberculosis has become prominent among agriculturists generally, an extreme jealousy,

especially when you come to talk of compulsory slaughter. Therefore I am bound to say that the question of compensation is very germane to the matter that seems to be present in the minds of many.

DR. NIVEN: I approve of giving compensation in proper cases, but I cannot commit my authority to a Resolution upon the subject of compensation. I should prefer to withdraw the Resolution rather than introduce the subject of compensation.

DR. SCURFIELD (Sunderland): I have only one suggestion to make—namely, that when the Report of the Royal Commission came out, they expressed the opinion strongly that a great deal might be done towards the extermination of bovine tuberculosis. I think where compensation has been given in cases of pleuro-pneumonia and swine fever, it has always been coupled with, and conditional on, an attempt to get rid of the disease. The Royal Commission two years ago expressed a strong opinion that if the Government took up the question of gratuitous distribution of tuberculin, including the services of a veterinary surgeon to perform the test, a great deal might be done in that direction by seeing which animals reacted or did not react to the test, on the system that has been carried out in Denmark. In the Veterinary Section, the other day, an absolute expression of opinion was passed as to the great value of the test, and some speakers who had had a great experience, including Professor McEachran, of Canada, expressed the opinion that in ninety-eight per cent. of cases the diagnostic value of tuberculin was found to be absolutely correct. Other speakers referred to it as practically infallible. This is not a new thing. Professor Bang, of Denmark, as long as eight years ago, gave an opinion somewhat similar, and also Professor Nocard, of France, and since that time their observations have been confirmed in Great Britain. My suggestion is simply this—that all compensation in cases of tuberculous animals ought to be conditional on an attempt to get rid of the disease. I am strongly of opinion that a great deal could be done to get rid of the disease, and also that compensation should be limited to the animals I have mentioned, otherwise the compensation will go on in exactly the same way from year to year, and farmers will take no steps to get rid of the disease, compensation thus being a standing charge. If the compensation is coupled with an attempt to get rid of the disease, it will no doubt to a large extent be successful, and the amount paid in compensation will be of gradually diminishing quantity.

THE PRESIDENT: The Resolution is: "That it is desirable that power should be given to sanitary authorities to have cows proved to have tuberculous udders slaughtered under veterinary inspection." An amendment has been moved by Dr. Easton, of Fulham, seconded by Sir Edmund Verney, to add the words "subject to compensation."

The amendment was put, and, the voting being very close, the President decided to take another show of hands.

The amendment was then put a second time, and declared lost.

DR. SCURFIELD: May I move an additional amendment as follows: "Compensation conditional on an attempt to extirpate the disease"? The principle of compensation seems to me to be absolutely sound if an attempt is made to extirpate the disease. I want to know if it is possible to have that embodied in the Resolution. There is no doubt we shall not get any further with this question unless there is compensation.

THE PRESIDENT: I think we had better consider the question disposed of under the last amendment; it can hardly be raised again in another form. Therefore I put the original question: "That it is desirable that power should be given to sanitary authorities to have cows proved to have tuberculous udders slaughtered under veterinary inspection."

SIR EDMUND VERNEY: I beg to move as an amendment: "And to take the necessary steps for the extermination of the disease."

DR. SCURFIELD: I beg to second that.

DR. LYON WILSON (Edinburgh): May I ask when these amendments are going to stop?

THE PRESIDENT: I am afraid Sir Edmund Verney's amendment is hardly one that can be read into this Resolution, and I recommend that you take a vote on the original Resolution.

The Resolution was then put and declared carried unanimously.

"THE CHANGES REQUISITE IN EXISTING LEGISLATIVE AND ADMINISTRATIVE MEASURES FOR IMPROVING THE CONDITION OF COWSHEDS, AND ENSURING THE HEALTH AND CLEANLINESS OF MILCH COWS."

By CHARLES PORTER, M.D.,

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BEFORE venturing suggestions as to legislative changes it is necessary to consider what legal provisions already exist for these purposes. They are:—

1. The Dairies, Cowsheds, and Milkshops Orders, 1885 and 1886.
2. The Contagious Diseases (Animals) Act, 1886, *Sec.* 9 (4) and (6).
3. The Infectious Diseases (Prevention) Act, *Sec.* 4.
4. The Regulations made under the above Orders.
5. The Tuberculosis Clauses of certain local Acts.

The Dairies, Cowsheds, and Milkshops Order of 1885 (for offences against which the Order of 1886 provides penalties) is made under the Contagious Diseases (Animals) Act, 1878, *Sec.* 34, and (briefly) provides for the registration, sanitary construction and maintenance of dairies and cowsheds, and the making of regulations for their good ordering, and for the inspection of cattle (Art. xiii. (a)).

pr the use of milk from a diseased cow "for food of swine or other nd until it has been boiled" (Art. xv. (c)). But the Order as applies to the diseases scheduled under the Contagious s (Animals) Acts, of which tuberculosis is not one; and though the Order of 1899 extends the 1885 Order so as to prohibit the ing of tubercular milk with other milk, and its sale or use for human food, es not apply at all to the regulations for inspection of cattle in dairies, or of ed tubercular milk as food for other animals. Thus, at the one is met with the *astonishing fact that a sanitary authority has no to ulations for the inspection of tuberculous cattle in dairies, and no to f the feeding of animals on tubercular milk*, although we know that swine are spec o tub losis, and that the great majority of calves that become infected are infected through the milk of tuberculous mothers (Report Royal Com. 1898, par. 14 and 50).

Surely the Dairies, etc., Order of 1899 was unintentionally limited in its application.

The Contagious Diseases (Animals) Act, 1886, *Sec.* 9 (4), gives a local authority's officers right of entry on premises within the authority's district for the purposes of the Dairies, etc., Orders. But, as the Act does not apply to tuberculosis, *the second surprising fact appears—viz., that the officers of a sanitary authority have no legal right of entry into any cowshed in reference to tuberculosis in the cattle therein.*

Outside its own district a sanitary authority has apparently no power to inspect milch cows, either in regard to tuberculosis or any other disease, even though the owner of the cows is registered in its district as a milk-seller, and sells such cows' milk therein. The benefit of registration is thus largely lost, as an enlightened district may be left at the mercy of an apathetic one. Clearly, therefore, statutory powers are required for the inspection of milch cows, in regard to tuberculosis or any other disease, by the officers of any authority within whose district milk from the cows in question is supplied.

The 1886 Act also makes the rural and urban sanitary authorities the local authority in their districts, in place of the previous "county authority"—*viz.*, the Justices in Quarter Sessions, of whom, in administrative matters, the County Councils are the successors.

It thus comes about that, although the *County Councils* are still the local authority under the Contagious Diseases (Animals) Act, they *have absolutely no powers in regard to dairies and cowsheds, nor in reference to tuberculosis*, because it is not scheduled under that Act. Consequently, the Shropshire County Council, when recently invited to take action in obtaining concerted veterinary inspection of milch cows, and in providing facilities for tuberculin testing, found itself absolutely powerless to do or spend anything for this purpose.

County Councils should certainly receive statutory powers in the directions indicated, and, as in regard to rivers pollution prevention, analysis of food and drugs, and housing of the working classes, they should possess, in respect of dairies, cowsheds, and milkshops, direct executive functions concurrent with those of the local sanitary authorities.

The Infectious Diseases (Prevention) Act, 1890, *Sec.* 4, gives the Medical Officer of Health powers of inspection of dairies *in his district* and of the animals therein, if there is evidence that any person is suffering from disease attributable to the milk therefrom. Similar inspection of *outside dairies* may be made on a Justice's order.

This measure primarily protects the consumer, but, secondarily, tends to improve the condition of cowsheds and cows. Unfortunately, however, the word "disease" is limited here to "notifiable infectious disease," which does not include tuberculosis.

The latest Regulations under the Dairies, etc., Order, dated March, 1899, when tested by the Royal Commission's structural recommendations as to cowsheds, are apparently satisfactory, though other codes—*e.g.*, that of Manchester—are much more explicit and detailed. In regard, however, to cubic space requirements, the Model Code does not meet with unqualified approval on all sides. It divides cowsheds into two classes. The first consists of those "the cows from which are habitually grazed on grass land during the greater part of the year, and when not so grazed, are habitually turned out during a portion of each day": for these, which may be described as "country cowsheds," nothing whatever is specified about cubic space. For the second class, which includes all other cowsheds, and may be termed the "town cowsheds," 800 cubic feet of air space per cow is suggested as the proper allowance. The omission to specify cubic space requirements in rural districts is presumably a consequence of the Royal Commission's finding that physical circumstances vary so much in different rural localities that it is not practicable to prescribe a uniform minimum; but this hardly explains the absence from the Model Code of any reference whatever to cubic space, for the Commissioners recommended "such space per cow . . . . as would . . . . secure reasonable ventilation without draught." This is an unfortunate difficulty in the Regulations, for it has been truly said that "by far the worst constructed, worst ventilated, and the dirtiest cowsheds are to be found in villages, hamlets, and rural areas." Moreover, as pointed out by Dr. Niven, milch cows in towns are mostly young, are kept for one year only, and are then slaughtered, whereas milch cows in the country are, for breeding purposes, kept very much longer, often under much less favourable cowshed conditions, have a longer time in which to develop tubercle, and, as a matter of fact, suffer from it more frequently, as Manchester and Liverpool statistics have very clearly shown, the actual proportions of infected town and country milk being 13·4 to 5·2.

With regard to the objectionable practice of placing cows with their nostrils close to the wall, and thus minimising their chance of breathing fresh and moving air, no regulation exists, and there would not appear to be any statutory power to frame one, unless (which seems doubtful) it could come under the heading of "regulating ventilation." Mr. John Speirs, one of the Royal Commissioners, himself found that the air at the head of such stall was usually more polluted than elsewhere, and it is precisely at this point that a sufficiency of moving air should be provided if infection from cow to cow is

to be prevented. This may be effected by having a 4 ft. passage or fodder-arm at the heads of the cows.

Valuable suggestions as to cowshed construction have been issued in Sheffield by Dr. Harvey Littlejohn, and in Manchester by Dr. Niven, and some memoranda issued in Stockport in 1897 by the writer are appended hereto.

The Tuberculosis Clauses of 1899 (Manchester, Stockport, Derby, etc.) provide for: (1) Notification of actual or suspected tuberculosis of the udder; (2) inspection of milch cows either within or without the district, and sampling of their milk; (3) penalties for selling milk of cows with tuberculous udders, and for failing to isolate such animals; (4) the application, with consent of owners, of the tuberculin test to cows by a veterinary surgeon.

These powers have been used considerably in Manchester and Derby.

Dr. Howarth (Derby) thinks that other restrictions are very necessary, because suspicious cows are removed immediately after a sample has been taken, and the tendency is to create an objectionable trade in cows with doubtful udders.

Dr. Niven (Manchester) considers the clauses undoubtedly valuable, and that they have brought about the removal of over forty cows with tuberculous udders from dairies supplying milk to Manchester. Like Dr. Howarth, however, he points out that there is nothing to prevent the sale of a milch cow, which the owner knows to be tuberculous, to some other party who may continue to use it for milk-producing purposes. This difficulty appears obvious, and the writer thinks it can only be met by measures such as some of those applicable under the Contagious Diseases (Animals) Acts to pleuro-pneumonia, swine-fever, etc.—*viz.*, declaration by local authority of "infected places," out of which the infected animals must not be moved, together with power to test with tuberculin, and, if reaction follows, to slaughter.

This power to slaughter is recommended by the Royal Commission, 1896, and at once raises the vexed question of compensation. The Commissioners think that if, *post mortem*, the slaughtered milch-cow were found to be free from tuberculosis, the owner should be paid its full value, but if tuberculosed, then only the proceeds of the sale of the carcase. As it is impossible to detect localised tuberculosis in the living animal from its outward appearance, and as there may possibly be no outward sign of even generalised tuberculosis, the latter proposal would often involve great loss and hardship on the owner. Whilst, therefore, no compensation should be given for a carcase with general tuberculosis, one ventures to think that, for a limited period after the public provision of facilities for tuberculin testing, a *via media* should be taken in regard to an owner of a milch cow with *localised* tuberculosis, who can prove that within a reasonable time of slaughter he gave a fair price for the animal and that he could not then have reasonably known or suspected that the animal was tuberculous.

According to MacFadyean (Min. Evid. Royal Com., 1896, par. 1256), "it is exceedingly rare for a cow to be attacked with tuberculosis in the udder first; it is also rare to get a cow that has tuberculosis of the udder and only slight tuberculosis elsewhere. Tuberculosis of the udder is usually

found in advanced cases of tuberculosis. Even if all cases of tuberculosis in cattle were allowed to die . . . . only a small percentage of them would ever get tuberculosis of the udder." If this be true, no compensation would be necessary in regard to most cows with tuberculous udders, as they would be suffering from generalised tuberculosis.

It is said that compulsory slaughter and compensation have been a costly failure in Belgium and elsewhere—*e.g.*, Massachusetts—but it is not clear whether Belgian procedure was controlled by the tuberculin test, and even if it were, improved technique has given it a present value it did not then possess. And though the Royal Commissioners condemned as impracticable for tuberculosis the methods under the Contagious Diseases (Animals) Act by which pleuro-pneumonia has been stamped out, they nevertheless recommended compulsory (par. 43) slaughter. If to this be added the very necessary and reasonable powers of prohibiting the removal of suspected animals and the endowment of County Councils with executive powers, something closely resembling the machinery of the Contagious Diseases (Animals) Act *without compensation* is evolved. But, until this compensation question is settled, the powerful agricultural and meat trade interests of the kingdom are, the writer is convinced, strong enough to block any proposed legislation for dealing effectively with bovine tuberculosis.

Elimination of Tuberculosis from Herds by means of Tuberculin Testing.—The successful experience of Denmark led the Royal Commission to recommend that the Board of Agriculture be empowered to provide gratuitous testing of stock whose owners will undertake to keep them under satisfactory conditions and to isolate reacting animals. If, in addition, the calves of tuberculous mothers be fed on boiled milk, if healthy animals be re-tested one or twice a year, and if purchased animals be only beasts which have withstood this tuberculin test, Prof. Bang believes that a markedly affected herd may be replaced by a healthy one. The writer ventures to think County Councils and County Borough Councils, who already have to provide a veterinary staff for the purposes of the Contagious Diseases (Animals) Act, might, with advantage in suitable cases, have the power of providing gratuitous tuberculin tests delegated to them by the Board of Agriculture.

Official registration and the branding of cattle which have withstood the test have been suggested, but branding, at any rate, is open to the objection that tuberculosis may develop after the performance of the test, whereas the brand would be apt to be regarded as a permanent hall-mark of soundness.

Dr. Meredith Young has called attention to the fraudulent use of tuberculin for "fortifying" tuberculous animals against a subsequent application of the test. This, of course, ought to be penalised. He has also suggested that imported animals should not be landed in this country until they have first passed the tuberculin test. But are not practically all these animals immediately slaughtered, and their carcases inspected, at Birkenhead or Deptford?

Protection of Inspecting Officers.—In any legislation for dealing with tuberculosis, it is most essential that a clause should be inserted similar to Sec. 265, Public Health Act, 1875, for the protection of all medical, veterinary, or other

sanitary officers from personal liability in respect of anything done *bonâ fide* for the purposes of such legislation.

To summarise briefly:—

I.—General legislation is urgently necessary for the following purposes:—

1. Inasmuch as no such powers already exist in reference to tuberculosis, to empower urban and rural sanitary authorities to inspect, in regard to tuberculosis and any other disease, cows and cowsheds, wherever situated, from which milk is supplied to their districts.

2. To endow County Councils with concurrent powers.

3. To amend and extend the provisions of the Dairies, etc., Order of 1885 so as (1) to make applicable to tuberculosis its regulations concerning the inspection of cattle; (2) to prohibit the use of milk from tuberculous udders as food for animals unless first boiled; (3) to provide for a sufficiency of moving air at the heads of milch cows kept in cowsheds.

4. To empower the Board of Agriculture to provide, on specified conditions, for free tuberculin testing of the stock of all assenting owners, and to delegate, where desirable, the administrative details to County Councils and County Borough Councils.

5. The application to the kingdom generally of powers on the lines of the tuberculosis clauses of various local Acts, with the further powers of prohibiting the removal of suspected animals and of applying the tuberculin test.

6. The compulsory slaughter of all reacting animals, as it is impossible, except by an almost impracticable system of espionage, to ensure their isolation and the disuse of their milk.

7. The payment of full compensation when the slaughtered animal is found to be free from tuberculosis, and of substantial partial compensation when the disease is localised, but only in such cases.

8. Penalising the fraudulent use of tuberculin for "fortifying" purposes.

9. Protecting from personal liability sanitary officers acting *bonâ fide*, as per Sec. 265 of Public Health Act, 1875.

II.—Administrative changes as implied by the legislative proposals just enumerated, and in addition—

1. Reference in the Model Regulations to some cubic space requirements for cowsheds in sparsely populated localities.

2. Periodical veterinary inspection of milch cows.

3. Dissemination amongst farmers and cow-keepers of information in regard to bovine tuberculosis, and especially in reference to the value of the tuberculin test and the importance of feeding calves on wholesome milk.

COUNTY BOROUGH OF STOCKPORT.

MEMORANDA *RE* COWSHED INSPECTION, ETC.

Effectual lighting: 3 sq. ft. window-space per cow required in Sheffield.

Adequate ventilation:

(*a*) *Inlets:* louvred openings, or windows falling in at the top, in walls at two opposite sides of the building.

(*b*) *Outlets:* extraction shafts in centre of roof, or, if one wall be without window or other opening, extraction shaft to be as near thereto as possible.

Adequacy may be tested :—

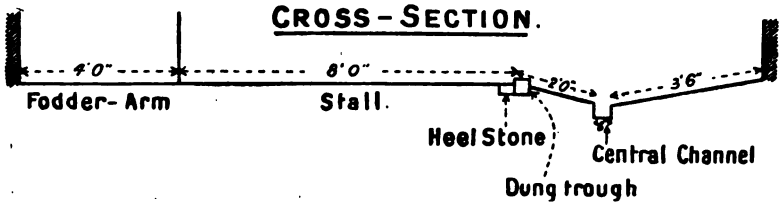
(*a*) By absence of oppressive smell when cows all housed.
(*b*) Estimation of CO_2 in air of cowshed.

800 cub. ft. free air space should be allowed per cow.

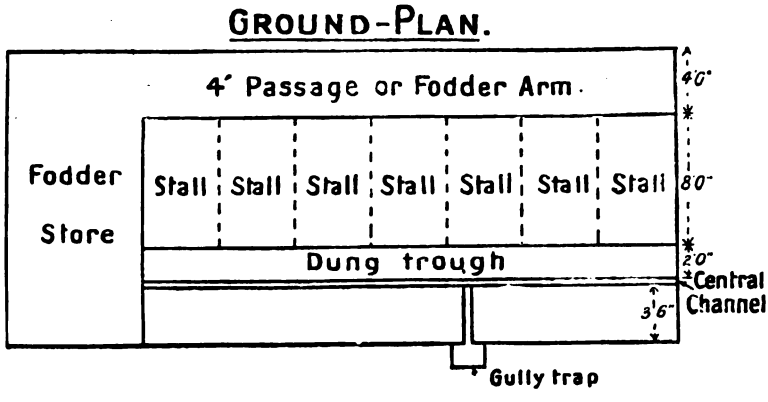
Floors of (1) concrete floated over with cement; (2) asphalt; (3) flags with cemented joints.

Should fall to central channel leading to opening, outside cowshed, of trapped drains.

Width not less than 14 ft., and, if possible, 18 ft. (for fodder-arm), thus :—



Fodder-arm = 4 ft. Stall = 8 ft. Dung-trough = 2 ft., with fall of 3 ins.
Central channel = 6 ins. Passage at back = 3 ft. 6 ins.



N.B.—Each cow should have a separate stall if possible.

N.B.—Each stall should have a separate stoneware manger trough.

Note.—In Sheffield that portion of each stall between the manger and the heelstone is allowed to be made of clay, as some cowkeepers insisted that if all flags or concrete, cows would suffer from inflammation of knees.

Walls to height of 7 ft. to be lined with impervious and easily cleansed material —*e.g.*, Portland cement.

Ceiling to be tongued and grooved if forming floor of hayloft, but in new buildings no loft should be allowed over cowshed.

Water Supply.—Byelaws require adequate supply of good water, cisterns to be of slate or metal and conveniently placed. In new cowsheds, service-pipe should convey water along head of stalls, with movable branch-pipe to each trough.

Manure-midden should not communicate directly with cowshed.

THE RELATIVE ADVANTAGES IN THE PREVENTION OF TUBERCULOSIS OF THE USE OF STERILISED MILK, PASTEURISED MILK, AND MILK OBTAINED FROM HERDS FREE FROM TUBERCULOSIS.

By E. W. HOPE, M.D.,

Medical Officer of Health of Liverpool.

One of the dangers of the tuberculous infection of human beings arises from the consumption of raw milk taken from cows which are themselves suffering from tuberculosis—notably tuberculosis of the udder. The object of the discussion which I have been asked to open is to determine which of three methods suggested furnishes the most practicable and the best safeguard against this danger, always bearing in mind that, if we decide to rely upon one, and are in a position to apply it with certain effect, we shall not necessarily exclude the others, unless we can be assured that in doing so we are not, whilst effecting security from one danger, discarding safeguards against others even more serious.

It is obvious that numerous points are involved in the subject, some of which are difficult to dissociate from questions other than those which concern tuberculosis only. For example, measures taken with the sole object of checking an even more destructive form of disease—*viz.*, diarrhœa—have proved incidentally a safeguard against tuberculosis, whilst, on the other hand, measures directed against tuberculosis have afforded a valuable protection from other forms of disease.

We must look at the subject from the wide view of general sanitation, remembering for the moment that there are other evils to be conquered as well as tuberculosis, and also bearing in mind that communities, like individuals, in their efforts to free themselves from mischief, may be doing harm to those of their neighbours who are less able to take care of themselves. In the remarks that I am about to make and for the purposes of this paper, I shall take it for granted that the phrase "properly cooled between the time of milking and the time of reaching the consumers" implies also cleanliness and all other sanitary requirements, except those specifically directed against tuberculosis, and furthermore, my observations will be restricted to those aspects of the subject which most concern the large centres of population.

The terms "sterilisation" and "pasteurisation," so far as the subject under consideration is concerned, have practically the same significance—*viz.*, raising the temperature of the milk to a degree which is capable of destroying the tubercle bacillus; exposure to a temperature of 170° to 180° Fahr. for about twenty minutes to half an hour is sufficient to destroy most pathogenic organisms. However, sterilisation and pasteurisation of milk possess one conspicuous advantage—*viz.*, that the application of the safeguard is within the reach of every reasonably prudent and careful household, consequently for

ease of application it is beyond any comparison with the other preventive measures to be considered. The objections to it do not appear to be important, but there are the facts to be reckoned with that in the lower quarters of every great town, there are thousands of families neither prudent nor careful, and also that the population of this country as a rule prefer to take their milk raw. This preference results, no doubt, partly from thoughtlessness and partly from habit. Young children are trained to take it raw, and the belief is widespread that if the milk is raised in temperature to, say, 200° Fahr., or even still nearer the boiling point, it is altered in flavour and constitution, and is of less nutritive and digestive value than when it is given raw; the raw milk, in fact, is regarded as more nearly approaching the natural milk of the mother.

There is no clinical evidence whatever to show that sterilised or even boiled milk is less nutritious and valuable than raw milk. On the other hand, cow's milk raw, in addition to the risk of tuberculosis, brings many others. The process of milking may involve dirt from a dirty milker, from dirty udders into a dirty milk-pail. From this it may be passed through a dirty strainer into a dirty railway-can. It is discharged from the railway-can into smaller vessels in which it is hawked about the dusty streets, passing through some half-dozen other pots and pans before it reaches the nursery or the table of the consumer, involving a host of possible sources of contamination, not excepting the contamination of tubercle bacillus; in fact, it may be safely said there is no article of food in common use so constantly exposed to contamination or so susceptible of contamination as raw milk. The milk, on the other hand, as Nature intended it to be given, is never once exposed to air, passing directly and at the time of its manufacture in the gland to the stomach of the young animal, and, apart from the possibility of disease in the gland, is bacteriologically clean and pure.

Sterilisation, valuable as it is as a final safeguard against tuberculosis, is, after all, only an expedient, and must not be put into so much prominence that the importance of the other safeguard is lost sight of, although we cannot take it for granted, in considering the merits of different methods, that essential accessories common to them all will be observed. The one merit of sterilisation is that it is an expedient easy of application and presenting few administrative difficulties. Beyond any question the ultimate advantage lies in obtaining the milk from herds free from tuberculosis. It is, in fact, comparable with the advantage of obtaining drinking water from a pure source instead of taking it from a contaminated one and relying upon purification afterwards. The first aim must be to ensure that the source of the milk is pure—in other words, that the cows are free from tuberculosis; or if this, under existing conditions of the law and public opinion, is unattainable, that they shall at least be free from any tuberculous disease of the udder, or any tumour or condition of the udder simulating tuberculous disease; or, having regard to difficulties in diagnosis, we may with advantage go even a step further and demand that the udder in all cows from which milk is taken for human food shall be in a perfect normal condition.

The main causes of tuberculosis in cows are notorious: close confinement in ill-ventilated, badly-lighted, ill-constructed and dirty cowsheds—defects all as easy to remedy as is removal from the cowshed of the obviously tuberculous animal before it can cause infection of the rest.

In the city of Liverpool about 26,000 gallons of milk are consumed every day; one-half of it comes from cows (about 6,000 in number) kept within the city, the other half comes from cows kept in the country and is sent in by rail. Within recent years that part of the milk supply which comes from cows kept within the city has been practically free from tuberculosis. This has been brought about by the sanitation of the cowsheds, adequacy of air, light, and cleanliness, by systematic and frequent inspection of the cows by qualified inspectors with veterinary help, by frequent bacteriological analysis of the samples of milk: these are the measures which have effected this end. I do not say that out of the 6,000 cows in the city there is not a single one affected with tubercle, but merely that there are few with such form of tuberculous disease as would be likely to contaminate the milk supply.

These methods and this system of inspection were not initiated without difficulty and opposition. There is no opposition now; every person acquiesces in advantages which have been gained. But there is another aspect to the question. Only one-half of the quantity of milk consumed in Liverpool is supplied from the city; the remaining half comes from the country districts. But surely, you will say, if the cows kept in the cowsheds within a great and populous city are healthy, those coming from the sunny meadows of the country, with their fertile pastures and ample land, are free also. Unfortunately experience does not bear this out; the milk sent in from the country is more frequently tuberculous. Thus, out of 422 town samples examined during 1899 and 1900 five were tubercular, being slightly above 1 per cent.; but out of 490 country samples taken during the same period twenty were tubercular, being a trifle over 4 per cent. How can we protect ourselves against this? A special Act of Parliament applying to a few great towns, including Liverpool, gives special powers to exclude from the city, under a penalty, the milk coming from the country cowsheds in which tuberculous cows are kept under dirty and insanitary conditions. But if it is difficult to deal with and supervise the supply within our own city, it is evidently both costly and difficult to maintain a staff to send, under the special Act of Parliament, to the insanitary and tubercle-ridden cowsheds of the country cowman; but, having overcome these difficulties, the broad national question comes in, for although we succeed in protecting ourselves, what happens with regard to the diseased cows and the diseased milk? The dealer refrains from sending diseased milk to the protected city, but what is there to prevent him from sending his milk for sale and consumption to a district where no special Act of Parliament exists to enable the community to protect itself, or from selling his diseased cows to a dairyman in another locality? This is not the way to secure a supply of milk from herds free from tuberculosis, but there can be little doubt that the action of the great cities will not only protect themselves, but will to a certain extent protect the country districts also, and

will strengthen the hands of rural sanitary authorities. No doubt the great cities are financially better able to protect themselves; they have their larger and more costly staff, they have their bacteriological laboratories, their veterinary and medical officers, but at best they are but valuable allies to the rural sanitary authorities, and these, after all, must take their own action, since the protection the cities afford them is an indirect, vicarious one, and, as in cases which I have alluded to, there is nothing to prevent the cowkeeper from sending his diseased produce to rural districts after he has been prohibited from sending it to the great cities. Furthermore, the undoubted decline in the proportion of tuberculous milk sent in from the country may really mean that a larger proportion is consumed elsewhere. The subject is quite important enough for a Government department—*e.g.*, the Local Government Board—to take in hand and appoint a special staff to supervise the milk supply and all appertaining to it throughout the country.

I have no hesitation whatever in saying that it is quite possible to ensure that the milk supply shall come from cows free from tuberculosis. Difficulties from ignorance, obstruction, and active opposition may be taken for granted; but these must be overcome, and the cowkeeper will learn in time that his own interests are identical with those of his customers, and by keeping healthy cows in a sanitary condition he will be a gainer in every way.

It is only right to say that during last year samples of milk taken at the railway stations on arrival from the country do not appear to be more frequently tubercular than the samples taken from the town.

This may indicate one of two things: either a general improvement in the country cowsheds under the stimulus of city action, or, as in more cases than one which have come under my notice, dairymen who have been detected in sending in tuberculous milk have refrained altogether from sending milk to Liverpool, and now send their milk elsewhere. These are points not to be lost sight of.

By H. DROOP RICHMOND, F.I.C.,

Analyst of the Aylesbury Dairy Company, Limited.

A.—Efficiency of the Three Methods.

It will be accepted without need of proof that milk which is free from *B. Tuberculosis* cannot give rise to tuberculous disease; it will be further accepted that the milk of herds free from tuberculosis can only cause this disease if afterwards infected; and, further, that the organism is destroyed by heat. I do not propose to discuss here what is the minimum temperature and time of heating to which milk must be subjected to destroy *B. Tuberculosis*, as not only will this subject receive treatment from abler hands than mine before other sections of this Congress, but published work has already settled that the methods of heating which can be commercially applied attain the desired end. I therefore start with the premise that all three methods, if properly applied, will

yield milk which will not cause tuberculosis, and their relative advantages will depend on considerations of cost, and how far the nutritive qualities of milk are affected by the treatment.

B.—Chemical Changes on Heating Milk.

Starting with milk at the ordinary temperature, which has been kept at this point for some time, as is the case with commercial milk, the first change on heating milk is the melting of the fat globules at about 32° to 33° C.; as this change would, under any circumstances, occur on ingestion, it is unimportant.

At about 60° C. a skin commences to form on the surface of milk if freely exposed to air; this is probably an oxidation product of the casein, and no doubt evaporation and concentration on the surface assists the formation of the solid; there appears to be no evidence that this compound is more difficult of digestion than casein itself.

At about 70° C. the albumin is modified, though not, as is sometimes stated, coagulated; it is converted into a form, which is precipitated by acids in the same way as casein. The view, now generally accepted, that both casein and albumin exist in milk in combination with bases, explains the behaviour of albumin in heated milk; the salts of both uncoagulated and coagulated albumin are soluble, and both forms are set free by acids; only the uncoagulated albumin is soluble in water. Coincident with the change in the albumin an alteration in taste occurs. The mucoid proteid of Storch is also affected by heat; according to him it exists in milk in a swollen state in combination with water in gelatinous masses, there being about 5 to 8 parts of proteid combined with 100 of water; on heating, this loses water, and is partially dehydrated, a change which certainly occurs at 70° C., and probably below. A deposit on the sides of the vessel in which the milk is heated is noticed at 70° C. or a little below; this is due to the formation of gas bubbles, and the production round them of the oxidation product of casein.

At about 80° C. the enzyme (or enzymes) of milk are altered; treatment with the phenylene-diamines and hydrogen peroxide no longer gives an immediate blue coloration, and, as Babcock, Russell, and Vivian have recently shown, the self-digestion of milk no longer goes on after heating to about 80° C. At this temperature milk loses its antiscorbutic qualities, and as there is some probability that the enzyme plays a part in conferring immunity from Barlow's disease, it appears that milk is prejudicially affected by heating to 80° C.

At higher temperatures, especially at 100° C. or above, changes occur to a marked extent, which have probably commenced at lower temperatures. There are caramelisation of the sugar, fusion of the fat globules, and production of large masses of fat and marked alteration of taste; possibly slight changes in the proteids, or their combination with salts occur. At no point is there any appreciable deposition of calcium salts from the milk, though minute traces of the citrate and phosphate are thrown down; it is not impossible

that calcium salts are deposited on the fat globules, as these tend to rise much more slowly in milk which has been boiled than in fresh milk. Milk heated to 100° C. curdles less easily with rennet, and the amphoteric reaction to litmus is less marked.

Chemical considerations show that sterilisation (heating to over 80° C. for long periods) has less to recommend it than pasteurisation (heating to lower temperatures for short periods).

C.—Discussion of Commercial Methods.

(*a*) Pasteurisation. This term is applied to heating milk to temperatures ranging from 50° C. to one approaching 100° C. for a short period (not exceeding 20 minutes). In practice, temperatures below 60° are not used, and 70° to 72° is perhaps the most generally adopted. Recent researches at the Wisconsin Agricultural Experiment Station have shown that constant agitation of the milk is necessary. Russell and his colleagues were able to destroy *B. Tuberculosis* by short exposures (10 minutes) at 60° C. if the milk was agitated; but this organism withstood much higher temperatures and longer exposures if the milk was at rest. Pasteurisation in bottles, which cannot be agitated, is therefore dangerous, and the ingenious apparatus of Hewlett, in which a constant bulk of boiling water heats up a measured volume of milk to 70° C. in 15 minutes, also cannot be depended upon.

Of the methods of commercial pasteurisation, the Lawrence pasteuriser is convenient. This consists of a vessel with fluted walls, over the outside of which milk flows in a very thin layer; the inside is filled with water, which is kept at or near the boiling point, and by regulating the flow of milk it is heated to any desired temperature. The time of heating is too short to be absolutely safe, though probably owing to the tremendous agitation of the milk in running over the fluted sides, it is far more efficacious than would be imagined. A very usual form of pasteuriser consists of a steam jacketed pan, in which a stirrer is kept revolving; the milk flows in at the bottom and out at the top, and the flow and rate of heating are so arranged that the milk can be kept at any desired temperature for the requisite length of time; there is, however, a possibility that portions of the milk may pass from bottom to top without being subjected to the necessary heating; this is obviated by having two or more pans in series, the first one acting as a heater, and the subsequent ones maintaining the temperature for the necessary time.

Pasteurised milk is but little altered in taste and nutritive quality, though the cream does not rise quite so rapidly as in new milk, and it looks poorer. The chief drawback to pasteurisation lies in the fact that the normal acid-producing organisms are destroyed, and the organisms which are left or which may find entrance sometimes produce an unpleasant taste; pathogenic organisms may find entrance and, in the absence of others which are inimical to their growth, multiply rapidly; in practice, with ordinary care, these drawbacks are almost infinitesimal. The cost is very small.

(*b*) Sterilisation. As the object of sterilisation is to kill all micro-organisms, milk must be protected after sterilisation; this is secured by sterilising in vessels which are closed immediately the sterilisation is complete. Commercially intermittent sterilisation is not practicable, as the cost of handling the vessels several times is great, and the cream has a tendency to fuse more and more at each successive heating. Two sterilisations are the utmost practicable; temperatures of 100° C. or over may be used, and the length of heating depends on the temperature. Higher temperatures are more effective than lower ones.

Sterilised milk is distinctly changed in taste and affected in nutritive qualities, and is deprived of antiscorbutic properties; unless efficiently sterilised, highly resistant spores may be left undestroyed, and as infantile diarrhœa is due to this class of organisms, the milk may be dangerous. The cost of sterilisation is much greater than that of pasteurisation, but, as it will keep for a considerable time, a supply for several days can be delivered at once, and the extra cost of the sterilisation is at least partly met by a saving in the delivery.

(*c*) Protection of milk by veterinary inspection.

Some time back the directors of the company with which I am connected desired to find the best practical means of ensuring the freedom of their milk supplies from tuberculosis, and consulted the Royal Veterinary College on this point.

A scheme was therefore worked out by the company's advisers which practically ensures the milk supply to be not only free from tuberculosis, but only drawn from healthy cows. The system is as follows:—

Every month each cow is clinically examined by the company's local veterinary surgeon; any cow showing symptoms of disease is at once withdrawn from the herd, and her supplies temporarily stopped, while a sample of her milk, sent to the research laboratory of the Royal Veterinary College, is examined. If the report is unfavourable she is at once condemned, and the owner gives a guarantee under heavy penalties not to send her milk to the company again; if, on the other hand, nothing suspicious can be found, the local veterinary surgeon receives instructions to test the animal with tuberculin; if she reacts she is condemned, but if she does not she is readmitted to the herd.

The success of this system is evidenced by the fact that out of something like 3,000 cows the number suspended in 1900 was only forty, of which sixteen were condemned without testing, and the owners elected to withdraw at once; of the remainder eight were tested and reacted, eight were tested and did not react, while eight were only temporarily on the sick list, and were taken back into the herd on recovery. The smallness of the number is due to the fact that many herds were tested with tuberculin, and reacting animals removed.

The cost of this system is greater than that of pasteurisation.

Dr. Easton (Fulham): I should like to ask a question of Mr. Rich-

mond. Does the company he represents sterilise milk altogether regardless of whether it contains bacilli or not? Do they sterilise milk from animals suffering from tuberculosis, and pure milk, mixing it altogether and sterilising it as a whole, or do they take particular care that the milk which is subject to sterilisation has no tubercle bacilli in it?

MR. RICHMOND: The whole of the milk supply of our company is obtained from animals which are inspected regularly, and so I think it is extremely unlikely that the milk contains any tubercle bacilli. We do not take any special care, however.

COUNCILLOR JAGO (Hove): In view of the fact of the very great experience which Mr. Richmond has of milk supplies, I should like to put one question to him which it would be interesting to all of us to have cleared up—namely, is a rich milk more or less likely to contain tubercle bacilli than a poor one?

MR. RICHMOND: The milks which I have examined, which have been obtained from cows with tuberculous udders, have almost been to a considerable extent abnormal in composition. They have often contained as much fat as the average, but they have usually been deficient in milk supply and high in bulk. I am afraid I cannot give any more information. (Indistinctly heard.)

DR. C. E. SHELLY (Hertford): I wish to mention a matter which is of very great importance to those who have to do with the practical management of schools and large institutions, and especially to those who are responsible for their medical care. When you point out the risk with regard to milk to the heads of schools, they say, "But we boil our milk and therefore we are quite safe." If that is done throughout the country, and we inform people they will be entirely safeguarded if they boil their milk, we shall not get a bit of popular opinion which will help to safeguard us in the direction of having power and proper agents and dairy farms. The Association of Medical Officers of Schools has had this matter under consideration for some time. We have obtained statistics from large schools and other institutions extending over the past thirty-seven years, embracing the history of children, some 300 in number, varying in age from four to nineteen years. We find that, dealing with forty or fifty of these schools, only four of them have their own dairy farms and take special precautions. On these farms, in one case every cow is tested with tuberculin, and in all the others special care is taken with regard to the management of the cattle. All other schools adopt various precautions with regard to dealing with their milk and so-called sterilising it, but in some cases they take no precautions at all. We have a return of the illness supposed to be attributable to milk for the last thirty-seven years from these schools. It is at least a remarkable fact that while tuberculosis in no instance has been known to be traced to milk, the other diseases in small proportions—typhoid in proportion of ·011 per cent., and no scarlet fever—yet the schools which take special safeguards with regard to the source of

(*b*) Sterilisation. As the object of sterilisation is to kill all micro-organisms, milk must be protected after sterilisation; this is secured by sterilising in vessels which are closed immediately the sterilisation is complete. Commercially intermittent sterilisation is not practicable, as the cost of handling the vessels several times is great, and the cream has a tendency to fuse more and more at each successive heating. Two sterilisations are the utmost practicable; temperatures of 100° C. or over may be used, and the length of heating depends on the temperature. Higher temperatures are more effective than lower ones.

Sterilised milk is distinctly changed in taste and affected in nutritive qualities, and is deprived of antiscorbutic properties; unless efficiently sterilised, highly resistant spores may be left undestroyed, and as infantile diarrhœa is due to this class of organisms, the milk may be dangerous. The cost of sterilisation is much greater than that of pasteurisation, but, as it will keep for a considerable time, a supply for several days can be delivered at once, and the extra cost of the sterilisation is at least partly met by a saving in the delivery.

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their milk supply are the ones which come out absolutely free from any disease traceable to milk. The schools which boil their milk do not do so. With regard to boiling, there is another point which strikes me of some importance. The tubercle bacilli is responsible for tuberculous disease—that is to say, the patient takes his disease from the tubercle bacillus, but some of the most marked symptoms that he suffers in the illness from which he dies are due, not to the tubercle bacillus, but to the toxins which he produces. If you boil your milk and destroy thereby the tubercle bacilli, do you destroy the toxins which may be present in a milk from a tuberculous animal, although that milk contains no tubercle bacilli? You do not destroy all toxins by boiling. We have obtained evidence that the special form of diarrhœa which is due to drinking milk from cows which have eaten acorns is not destroyed by boiling. Curiously enough, two of the schools in question had epidemics of diarrhœa traceable to milk through their cows eating acorns, and it only ceased when they obtained their milk from another source. There is another form of septic sore throat which is induced by drinking the milk of certain cows suffering from certain forms of disease, which is not lessened by boiling the milk. It occurs if the milk is boiled, and it goes on so long as the milk is boiled, but it may be stopped in school by changing the source of milk supply. The poison in the acorn may be a chemical substance which is not destroyed by the boiling. The poison producing the disease is likely to be a pathogenic one, and those who have it in their power to make experiments may be able to tell us before long whether the particular poison, the toxins produced by the bacillus of tubercle, of diphtheria, of scarlatina and so forth, is destroyed by boiling or not. In any case it seems to me that if we can deal with this trouble at its source by freeing the cows from disease, and by so herding and caring for them that they are protected from infection, we are beginning at the right end of the stick, and that the other is the wrong end of the stick. As a supplementary measure, it may in some cases be extremely useful, and for another reason which has not been touched upon. It seems to me quite possible, from facts which have come within my own knowledge, and from others which will occur to everyone, that the ingestion of these toxins, if toxins they be, which escape the boiling of the milk, to a certain extent may confer an immunity, temporarily it may be, against disease produced by the bacilli. I think there is abundant evidence, for instance, in typhoid fever, that the ingestion of undoubtedly contaminated water does confer a certain amount of immunity upon the drinker if he be exposed to an undoubted source of infection, and it is worth considering whether there may not be some compensating advantage in the fact that even the boiling of tuberculous milk does not safeguard us against the tuberculous bacillus, but may even confer a certain amount of protection against the infection of that disease. That is no very strong argument against relying upon boiling milk as the cause of protection, but it is an additional argument for boiling milk under certain conditions. These are only fragmentary results, but they are results of many years' consideration and practical dealing with the subject, both as a medical officer of a large school and Secretary of the Association of

Medical Officers of Schools and Chairman of the Public Health Committee of my borough. It seems to me that these are questions which have hitherto been hardly adequately dealt with, and questions which might be commended to more careful, thorough, and painstaking investigations by those bacteriologists and medical officers of health to whom already we owe so very much in connection with this matter.

MR. BARRINGTON: I would beg leave to ask a question. I came from Ireland to attend this meeting to-day. I have a very large business in the supply of milk, and keep a large number of cows, and I am very anxious to hear what would be the effect on my cows if I allowed the tuberculin test to be used, assuming they were all free from the disease. I have not yet obtained an answer to that question. I believe the yield of milk would be seriously diminished. I am anxious to know to what extent I would suffer by allowing all my cows to be submitted to the tuberculin test, and I do not intend to allow them to undergo that test until some gentleman gives me some idea of what I will suffer.

DR. NIVEN: We have had very considerable experience in that matter, and if Mr. Lloyd could tell us the result, I believe it would be that for a few days there is a decided diminution, and afterwards no effect whatever.

MR. LAITHWOOD: In reply to the questions that have been asked by Mr. Barrington, so far as my experience is concerned, I may say that the cows will not suffer in any way from the testing with tuberculin. The only way in which Mr. Barrington will feel it will be by knowing that he has a certain number of diseased animals, and having to replace them by others. But I have never yet found any alteration in the healthy animal from its being subjected to the tuberculin test, neither do I believe it has any effect whatever on the quantity of milk supplied by these animals either during or after the administration of the test.

DIVISION IV.

PART I.

FOURTH DAY, FRIDAY, JULY 26TH, 1901.

THE RIGHT HON. SIR HERBERT MAXWELL, BT., M.P., F.R.S., IN THE CHAIR.

THE PROVISION OF SANATORIA.

SIR JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S.

I HAVE undertaken to direct your attention, in the few words I am permitted to address to you, to one narrow scroll of that vast and voluminous subject which is now being discussed in four sections and in many phases by the distinguished men assembled in this metropolis.

It is sanatoria, or special hospitals for the cure of tuberculosis, and more particularly of pulmonary consumption, that I have to bring under your notice, and in saying that I use the word "cure" advisedly. I am aware that pessimistic views as to the curability of consumption are still entertained in some quarters. The dictum quoted by Laennec, *que l'affection tuberculeuse est comme les affections cancereuses, absolument incurable*, has cast a long, sombre, and perhaps somewhat blighting shadow over the therapeutics of this disease; and quite recently Dr. Theodore Williams, whose opinions on such matters are entitled to respect, has repudiated the word "cure," and strongly urged that we should not commit ourselves to anything beyond an arrest of pulmonary tuberculosis. Now I venture to differ from Dr. Theodore Williams on this point, and the difference between us is no mere logomachy, but an essential one, and one calculated to affect the usefulness of sanatoria; for if all that these institutions can offer is an arrest—that is to say, an interruption or stoppage, more or less prolonged—in the course of an incurable disease, they will not commend themselves to public confidence and support, as they would do if they could hold out hopes of a complete and permanent restoration to health.

No doubt every severe disease by which the human body is visited leaves some residual traces behind it, some scars on the constitution; but for practical purposes these do not count unless they are kept in perpetual remembrance by the suffering they inflict, or the disability they involve. It is the rarest occurrence to find at an autopsy any human body in which no pathological changes are visible beyond those incidental to the disease that killed, or to senile decay. In almost every cadaver there are what might be called the fossil remains of palaeozoic disease; but because we observe in the ileum the obliteration of some of Peyer's patches, we do not say that an attack of enteric fever which happened perhaps forty years ago was arrested

and not cured; because we find on the breast a cicatrix marking the site of a carcinomatous tumour removed ten years previously, we do not maintain the incurability of cancer. Then why, I would ask, should the presence of a calcareous nodule or fibrotic patch at the apex of a lung justify us in arguing that phthisis, once planted, is ineradicable? The assumption that the tubercle bacilli are lurking in such foci, merely waiting the opportunity given by some deterioration of health or lowering disease to break forth again and spread havoc around, is gratuitous; for when, in such cases, phthisis does again supervene, it is just as likely to be due to fresh infection as to any stirring up of slumbering embers. Even when caseous masses, in which tubercle bacilli can be detected, exist in the lung, so long as these remain completely encapsulated and quiescent, and do not interfere with comfort or working power, their presence and certain problematical dangers that may attend them need not debar us from saying that the morbid process in which they originated was cured, any more than the persistence of some nodules round a joint prevents us from predicating cure after an attack of rheumatic fever.

The fact is that obsolete tubercle exists in the lungs of a large number of persons who are unconscious of its existence, who carry it about with them for years, and ultimately die of other diseases. Dr. Kingston Fowler found that in 2,400 post-mortems at the Middlesex Hospital, quiescent and extinct tuberculous lesions existed in 9 per cent., while Loomis has recorded a similar state of matters in seventy-one out of 763 autopsies in New York; Vibart, in Paris, has reported that out of 131 persons who met with violent deaths and were examined at the Morgue, seventeen had healed tubercular lesions in their lungs.

Within the last month, Dr. Frederick Hearder has carefully analysed for me the last 500 consecutive post-mortem examinations of persons from fifteen years of age upwards dying in my old hospital, the West Riding Asylum, Wakefield, with the result that in 170 of these—that is to say, in 39·2 per cent.—tubercular lesions existed. In ninety-three cases, or in 18·6 per cent., there was active tubercle; and in 103 cases, or 20·6 per cent., there was obsolete tubercle, appearing as contraction and cicatrisation in twenty-four cases, or 4·8 per cent., as fibrosis in thirty-five cases, or 7·0 per cent., as calcification in twenty-three cases, or 4·6 per cent., and as encapsulation in twenty-one cases, or 4·2 per cent.

These figures are significant, as showing the tremendous prevalence of tuberculosis amongst the insane in asylums, and as showing also how tubercle, once rendered obsolete, may continue so even under conditions most favourable to its renewed activity. In 103 persons in whom pulmonary tuberculosis had become obsolete before their admission to the Asylum, or during their residence there, it remained in that state in spite of the impaired nutrition and depressing conditions almost invariably associated with mental disease, in spite of association in the wards of a large institution with population pretty thick on the ground, with other patients in whom that malady was in its active stages. The cure in these cases, such as it was, held good to the last, even when it might have been expected to have broken down.

No doubt in a large number of cases of consumption, especially in its more advanced stages, a condition that can only be correctly described as an arrest is arrived at. Pyrexia and the more acute symptoms subside, bacilli are no longer found in the sputum, and there is improvement in general health, and diminution of the local physical signs; but wheezing, breathlessness, occasional cough, loss of strength, and chronic invalidism remain, with a constant liability to relapse. In such cases the disease is smouldering but not extinct. But in other cases—a still larger and, we trust, an ever-increasing number—what is practically a favourable termination of the disease is reached. The local lesions cease to give trouble, the constitutional symptoms vanish, energy and bread-earning capacity are restored, a ripe old age is attained, with scarcely a reminiscence of the phthisical past; or a long interval of good health is enjoyed before the disease again declares itself. In the two cases which Dr. Theodore Williams himself adduces in his recent paper to illustrate the inveteracy and incurability of phthisis, complete immunity from symptoms was enjoyed, in one for nineteen, and in the other for eleven years. Surely, under such circumstances, it is a misnomer to describe the long interval of health as an arrest, or as anything but a cure of the disease.

Koch has cited cases in which tubercular foci of large size have subsequently contracted and cicatrized, and permanently healed up; and even a whole lung may be destroyed and shrivelled, and the other preserved in its integrity. But it is in cases less pronounced, where slight infiltration at the apex in young persons from 13 to 30 years of age undergoes resolution, caseation or fibrosis, that what may be called genuine cures are obtained. In them, often enough, all unpleasant symptoms disappear, and they remain unmolested by the bacilli for the rest of their days.

The pathological evidence of the curability of consumption is convincing, and so is the clinical. We often see cases, in what used to be called the pre-tubercular stage, but what we now know by the proved presence of bacilli in the expectoration to be incipient tubercular disease, in which under treatment complete resolution takes place, general health being restored and no vestige of local change remaining in the cleared-up apex of the lung. To watch the progress of a case that has advanced beyond this stage is to witness a conflict between the bacillary and the corporeal powers, with the advantage now to one and now to the other. In the long-drawn-out struggle, so stubborn is the resistance of the tissues to the invader that our belief is almost revived in the exploded *vis-medicatrix naturae*, and we see that, even unaided, the assailed lung is largely capable of protecting itself. The observation of a large group of cases brings home to us the truth that consumption is susceptible of spontaneous cure, and powerfully suggests that in many instances its progress might be stayed, and its ravages repaired, by some slight reinforcement of the bodily powers.

It is to supply this reinforcement that sanatoria have been established. Consumption, as we now know, does undergo spontaneous cure, and there can be no doubt that it has from time to time been cured under, and perhaps

notwithstanding, one and all of the infinitely varied kinds of treatment to which it has been submitted. It is impossible to question the diagnosis or judgment of such a clinical expert and faithful historian as Stokes, when he tells us that he has repeatedly seen complete recovery from consumption take place in patients confined to bed, cooped up in hot rooms, kept on low diet, and treated by blisters, setons, and cough mixtures. I am not going to trace the several steps in the evolution of a more rational method of treatment that has landed us to-day in measures exactly the opposite of those I have enumerated. That would be an interesting but a tedious task, for which I have not time, and I will only say that our present system of treatment—that which is organised in the sanatorium—rests on a scientific basis that is irrefragable, and is already abundantly justified by its fruits.

I do not claim finality for that treatment. The time may come—pray Heaven it may!—when some sovereign and speedy remedy for tuberculosis will be put in our hands. The resources of clinical medicine are not yet exhausted. Bacteriological science progresses at automobile pace, and any day an agent may be discovered—an improved tuberculin, an anti-toxin, a serum, a germicide—that will seek out and kill the tubercle bacilli and their confederates in their lairs, or render them innocuous. Even now the intra-venous injection of formalin, as conducted by Dr. McGuire, seems to have a powerful influence in establishing pulmonary asepsis. But pending the authoritative promulgation of some effectual antidote that will operate directly on the bacilli or their products, our best hopes are centred in measures calculated to increase the corporeal resistance to their inroads. These measures, which may be summed up under fresh air, feeding, rest, and medical regulation—these measures alone, we now believe, skilfully employed, are capable of effecting a cure in a very large proportion of cases of consumption, if taken in time; and even should some prompt and infallible remedy for tuberculosis be discovered, they will still continue of value in promoting its action, and in removing the debility engendered by the malady it has extirpated.

It cannot be too loudly proclaimed, too widely known, that the sanatorium treatment has already largely extended the curability of consumption, and that in suitable cases it holds out hopes of recovery and of prolongation of life that could never have been entertained before its introduction. It is as yet too soon to form any exact numerical estimate of its results. Only approximate computations can be made, and these are subject to correction by the subsequent history of cases, and to discount for the too sanguine constructions of some of those making them. In Germany, where the open-air treatment has most copiously effloresced, though I am glad to remember it budded first in England, statistics are more reliable than those available in this country, because they extend over a longer period. The experiences of eleven years at Gorbersdorf gave in 1890 patients in the first stage of the disease, 27·8 per cent. cured, 31 per cent. nearly cured, and 41·2 per cent. not improved; and Mr. Rube has told us that of 8,000 insured men and women treated in the State sanatoria in Germany, 71 per cent. were discharged fit for

work, which is a criterion, not of cure, in many cases, but at any rate of the restoration of a bread-earning standard of health. Dr. Rowland Thurnam tells me that of 78 patients treated at Nordach-upon-Mendip, in the year 1899, 24 per cent. left the sanatorium absolutely cured, being able to return to their ordinary walks of life and with no signs of phthisis remaining, stethoscopic, thermometric, or microscopic; while 24 per cent. left relatively cured, not completely recovered, but still equal to a return to work and a fairly active life. Amelioration, short of relative cure, was secured in 37 per cent., and in 18 per cent. there was no improvement, or death. The absolutely cured cases have all remained perfectly well up to the present date; the relatively cured have suffered no relapses, and some report themselves as better, and quite well; while amongst the ameliorated cases there have been deaths, relapses, and steady improvement. At the model sanatorium at Mundesley, in Norfolk, there were 66 patients up to the end of last year, of whom 21 were discharged recovered, and 31 partially recovered, leaving 14 under treatment or unimproved. A return which Dr. Burton-Fanning has prepared for this Congress, dealing with 716 patients treated in thirteen sanatoria, gives 37·4 per cent. of recovery or arrest, and 40·1 per cent. of amelioration.

Without attaching too much weight to sanatorial statistics published up to the present time, this, at any rate, is clear—that these establishments already give results superior to those of the most successful health-resorts like Davos; and it may be confidently predicted that, as time goes on, and as their merits become known, so that an increased number of patients in the initial and curable stage of the disease resort to them for treatment, and as the general adoption of these preventive measures, which it is the main object of this Congress to recommend, leads to a general reduction in the virulence of the disease, their returns will become more and more satisfactory. In their early days they have had to grapple with a large proportion of advanced and hopeless cases; but, as a just knowledge of the nature of the disease and its amenability to treatment is disseminated, there will be less contributory negligence on the part of sufferers and their friends, more eagerness in seeking relief. Koch predicts that, if strict care be taken in the selection of suitable cases, and if the duration of treatment be sufficiently prolonged, it will certainly be possible to cure 50 per cent. of the cases in sanatoria, or perhaps more.

Seeing that the sanatorium treatment is accepted by the medical profession, upon the whole, as the best treatment of consumption at present available—and the unanimity of the profession on this point is remarkable—seeing that it saves many lives, that it prolongs the days and alleviates the sufferings of those whom it cannot altogether rescue; and seeing that it has the collateral advantage of aiding in the work of prevention, by isolating a number of active fountains of infection that but for it would be scattering the seeds of the disease throughout the community, it behoves us to bring that treatment within the reach of all persons affected by consumption who are willing to avail themselves of it. The sick and the sound will alike benefit by its adoption, the public burdens will ultimately be lightened by its beneficent

operation, and it is, therefore, good policy to bestow it on those who cannot provide it for themselves.

The expediency of this is now recognised in almost all civilised countries. In France, Italy, Russia, Norway, Sweden, Denmark, Switzerland, Austria-Hungary, Poland, Spain, Portugal, and in eleven of the United States of America, sanatorial hospitals have been provided, and in most of these countries the Government has seen fit to assist in their erection and maintenance, and in some cases to assume the entire responsibility for these. In Germany, which leads the van in this good work, upwards of one hundred sanatoria, with about five thousand beds, have already been called into existence for the treatment of consumptives; and, as the funds for these have been largely contributed by the State insurance companies, we may accept the fact that additional sanatoria are to be forthwith provided as conclusive evidence that, from a financial point of view, these hospitals have not been disappointing. It is actuarially established that the cure of consumption, on the large scale, in the working class, costly though it may be, is, in the long run, cheaper than the expenditure on sick pay and death duties, when it is left to run its unrestrained course.

The exact mode in which sanatorial accommodation is to be provided must, of course, vary in every different country, in accordance with its administrative system, its economical conditions, and the habits of its people; and we shall hope to hear from foreign representatives to-day some interesting particulars as to the methods adopted in their respective localities; but my duty is simply to introduce the question of sanatorial treatment in England, and to prepare the way for Mr. Brabrook, Sir John Burdon-Sanderson, and others who, with abundant knowledge and practical experience, will deal with the topic in several aspects and in greater detail.

Now England has been accused of having lagged behind in this matter, and the remarks made almost suggest that she has been callously indifferent to the sufferings and deprivations of her consumptive poor. But that accusation is not more just than those levelled against her for her inhumanity in war. It is not mere British arrogance, but sober truth, to declare that there is no country in the world where more ample and generous provision has been made for the sick and afflicted of all classes than in England. And consumptives have not been neglected. Our workhouse infirmaries, our sick asylums—some of them quite equal to the best Continental hospitals—have been always open to them; our general hospitals, as Dr. Pye Smith has pointed out, do not refuse them admission; and admirably-appointed special hospitals, like those at Brompton, Victoria Park, and Ventnor, have been provided by the charitable for their accommodation. With characteristic caution, England has not rushed into the new sanatorial movement until thoroughly satisfied as to its feasibility; but now that she is satisfied on that point, there will be no slackness or delay in her adoption of it. The progress made in the work of the prevention and cure of consumption since our National Association was formed, and since the King gave it his countenance, less than two years ago, has been phenomenal, and at the present

moment there is scarcely a county in England in which, either by private enterprise or public effort, a sanatorium is not being built or in contemplation. The really urgent work before us at this moment is to regulate and organise local activity; to determine the requirements of the country as a whole, and of its several districts, to prevent over-lapping and extravagant outlay; and to supply the best advice as to construction and management. And in this work the deliberations of a Congress such as ours may afford material assistance.

My contribution to these deliberations must be a small one, but I would briefly indicate what, it seems to me, is wanted in connection with sanatorial treatment in this country.

In making provision for that treatment, we have three classes of consumptive persons to bear in mind: (1) the affluent; (2) the competent; and (3) the indigent.

As regards the first of these, the affluent, they may, I think, be safely left under the guidance of the skilled medical advice which they can command, to provide what is necessary for themselves. Consumption is always prevalent in the inverse ratio of rateable value, and the problem of dealing with it among the rich is therefore a comparatively simple one. For them I am not prepared to maintain that treatment in a special sanatorium is always essential. I am not blind to the advantages of the discipline maintained in a large establishment, conducted with a sole eye to salubrity, or of complete subjection to the will of a medical autocrat, with a firm faith in his system, and the power of inspiring confidence. But such medical autocrats, indomitable and yet genial, are not everywhere to be found, and sanatoria have their drawbacks as well as their advantages; and on a highly-bred and highly-strung person, involvement in an agglutination of disease may have a depressing effect. For a majority, even of the affluent class of consumptives, the sanatorium with its simple ways and benevolent tyranny is, I believe, the best place; but I cannot contend that for some of them a private house may not, by architectural device, medical direction, and skilled nursing, be converted into a perfect sanatorium. Nay, I would go further, and say that for the affluent the sanatorium is not the kind of treatment to be invariably recommended. It cannot, I think, always supersede residence at high altitudes, in Egypt, on the veldt, or even sea voyages; and those who have every method of treatment available without stint must be guided by the physician, who will weigh the individual traits and requirements of each case.

I am inclined to believe that the sanatorial provision for the affluent in this country is already nearly sufficient. I have seen a list of twenty-two of these establishments already in operation in England and Scotland, and more are promised; and the law of supply and demand may be trusted ultimately to determine their number and characteristics. But the law of supply and demand, being one of the mills of God, "grinds slowly," if it "grinds exceeding small." And in the meantime, until selection has determined the survival of the fittest, a jealous medical eye should be kept on these establishments. The name sanatorium is unprotected, open-air is a *fera naturae* that

who will may capture, and the danger is that incompetent persons, without scientific knowledge or practical skill, or unscrupulous persons with a dingy dwelling, a meagre curtilage, and a rickety summer-house, designated anew: Nordach-cum-Wolverhampton—the Black Country being a substitute for the Black Forest—or Falkenstein-in-Finsbury, may draw into their nets unwary patients and discredit the system. I have already seen a publication in connection with one sanatorium which suggested the overweening confidence of the enthusiast or the craft of the charlatan; and it is incumbent on members of the medical profession, in choosing a sanatorium for their affluent patients, to be well assured of the character and qualifications of its medical head. To call high-class men who have identified themselves with such establishments "hotel-keepers," as has been done, is a gratuitous insult and grave injustice. They are hospital physicians, giving their whole time to their hospital work, and therefore properly remunerated directly, and they are conferring valuable services on the public; and for my part I think it much more desirable that sanatoria for the affluent classes should remain entirely in the hands of medical men, than that they should be exploited by limited companies or by lay speculators.

In turning to the competent class of consumptives, as I have called them—those drawn from that large section of our people whose incomes suffice to furnish the necessaries and conveniences of life without superfluity—we reach the point where eleemosynary aid becomes desirable. As long as health is preserved, these persons have ample means of subsistence; during brief illness they can meet all requisite charges; but when prostrated by a protracted disease that diminishes or cuts off income and demands a costly treatment, their resources are exhausted. Their state is really a pitiable one, for their independence of spirit is not lost in their undeserved poverty, and often enough they would rather die than apply for relief. Many of them can contribute some part of the cost of their maintenance and treatment while ill; and many of them, if restored to health, would gladly, when again earning money, repay to any institution the expenses of their illness. It is for them—for governesses, curates, clerks, young barristers and doctors, and civil servants, and for the wives and daughters of professional men, of farmers and small tradesmen—that sanatoria should be provided by the subscriptions of the charitable, or by the assistance of well-disposed capitalists who are willing to do a good work and receive a very small return for their money. In the sanatoria thus procured, a certain number of patients would, if they are to be useful, have to be received gratuitously or on the terms of deferred payment, should recovery take place—a payment which should, of course, be always voluntary and never enforced; but a majority of the patients would pay for their own board, in part or in whole; and my belief, founded on my experience of registered lunatic hospitals, is that when once built and furnished, and fairly started, these sanatoria would, under skilful management, become self-supporting. It is the initial expenses that have to be met. The cost of maintenance when they are launched need not—in sanatoria of sixty beds and upwards—exceed £1 10*s.* or £2 a week; a sum which, considering that the duration

of treatment will be on the average six months, a very large proportion of the competent class should be able to pay out of their own pockets. At Pinewood Sanatorium, which has been built out of funds advanced by Messrs. Rube and Lionel Phillips at 2½ per cent. interest, and where we shall have rent at that rate on an outlay of £30,000 to pay, we propose to open with a charge of three guineas a week, which we ultimately hope to reduce considerably.

In some of the county sanatoria that are now in view, thanks to local efforts, I have no doubt that treatment on a liberal scale will be put within the reach of those who cannot afford more than £1 5*s.* or £1 10*s.* per week; and as several counties that are leading the van in this matter have already, even in these pinching times of war, obtained by public subscription the amount required for their sanatorial needs, I am sanguine that their example and the encouraging reports they will soon be able to publish will stimulate other counties to do likewise, and that voluntary contributions and self-aid will do all that is necessary for the competent class of consumptives in this country. As to the constitution and administration of these sanatoria I shall say nothing now, but that they should be constructed in the simplest and most inexpensive style, and that their hospital character should be preserved by the appointment of a staff of consulting and visiting physicians. A resident medical officer must, of course, carry out the treatment and superintend every detail of domestic economy; but the patients should have the benefit of the highest medical skill and experience that the district affords. Any medical body or corporation putting obstacles in the way of the acceptance of office in such sanatoria by medical men of high standing would be incurring a serious responsibility, and would have to encounter a heavy reckoning with public opinion.

In the indigent class of consumptives is included the great mass of cases of the disease in this country—all those occurring amongst artisans, workmen, labourers, soldiers, sailors, domestic servants, seamstresses, shop-girls, etc. The line between them and the class immediately above them socially is not sharply defined, for of course a considerable majority of them are competent in the sense that they are supporting themselves and those having claims on them while well, and that by virtue of their own frugality they are not wholly destitute in sickness; but indigent they are in the sense that they are all in need of help of greater or less amount during any prolonged suspension of work, help which, in consequence of their number and distribution, must almost inevitably come from the public funds. Private charity cannot cope with them, and the sanatoria by which that valuable commodity, their skill and labour, is to be preserved to the community, when it is menaced by consumption, must be paid for out of the public purse. The problem of providing these sanatoria for the indigent is a large one to commence with, but as their curative influence is exercised, and as preventive measures begin to tell, it will become smaller and easier.

It is clear that these sanatoria for indigent consumptives must be distinct establishments, and cannot properly be tacked on to any existing institutions,

It is an infectious disease they are to harbour, and so they must be isolated; its treatment requires uncontaminated air and sunlight, and so they must stand apart in some country district away from centres of population. And as they must be isolated geographically, so, I think, they should be isolated morally from other institutions with which there may be a tendency to associate them. They should be kept free from any taint of pauperism, and have no point of contact with the Poor Law; for if this be not done, many of those likely to benefit by them would be reluctant to resort to them, and they cannot be driven in. I would suggest, therefore, that not district but county councils, acting singly or in combination, should be charged with the duty of erecting and governing them, just as in the case of asylums for the insane, and that they should be designated county sanatoria. In the Metropolitan District, perhaps the Asylums Board, that has so ably dealt with zymotic disease, might undertake this additional duty.

In these county sanatoria (once built) the maintenance and treatment should not exceed fifteen shillings a week per head, and that sum many of the indigent class could find for themselves throughout their limited treatment, while a still larger number could find a moiety of it. Then an arrangement might be made by which friendly societies and sick clubs would have the right to demand admission for their members who are consumptive, and their treatment for a fixed period, at the ordinary rate of maintenance. The contributions of indigent consumptives would go far to maintain these county sanatoria, and whatever was required beyond these contributions should be drawn from the county rate. The money thus expended would be profitably invested.

The medically certified existence of pulmonary consumption should be the one all-sufficient qualification for admission to these sanatoria, and residence in them should be prolonged until the disease has been cured, or bread-earning capacity restored, or until death in hopeless cases. A certain amount of internal classification would be necessary in these county sanatoria; but upon that I cannot now enter. They, like sanatoria for consumptives of every class, should, I think, be under the regular inspection of the Medical Officer of Health. The existence of county sanatoria would surely obviate some of the objections to the obligatory notification of tuberculosis.

I have been speaking this morning exclusively of sanatoria adapted to the treatment of pulmonary consumption, but I need scarcely say that the treatment adopted in these institutions is, with modifications, equally applicable to tuberculosis affecting other organs and tissues. The efficacy of what I may call sanatorial schools, planted in the keen but salving air of Margate and other points on our eastern coast, in tubercular adenitis or glandular enlargements in children, has been long recognised by the medical profession; and highly encouraging results have been obtained at l'Institut Vernuil, in Brittany, by exposing the victims of scrofulous joint disease to the blusterous breathings of the vexed Atlantic.

The ratepayer of this country is an Issachar, not couching between two burdens, but loaded with innumerable heavy bales that are bending down even

his strong back, and one hesitates therefore to propose the addition of even a small bundle to the pile; but when I suggest special schools in suitable localities, and under medical control, for the reception of poor children with swollen necks or crippled hips and knee-joints, I feel that I am only recommending a readjustment of the load which will give some immediate ease, and will in the long run permanently lighten it.

Our Asylums Board and our School Board in London have both concerned themselves with the education of the weak-minded. That is a beneficent and a useful undertaking, and no one grudges the large sums of money that have been expended on it; but it has obvious limitations, for you may gild but you cannot expand "the straitened forehead of the fool," and considering the great multitudes of poor children in our pestiferous city hutches and hovels who are maimed and lamed for life by the burrowing of the tubercle bacilli in their glands and joints—to say nothing of those who go under and are deposited in batches in our suburban cemeteries—considering further that the children thus afflicted are often not only of rare physical beauty but of fine mental fibre—for tubercle is greedy of our fairest and best; and considering that their affliction is in its early stages very remedial, I do not hesitate to affirm that the care and cure of scrofulous children is a more pressing and promising public obligation than the education of the weak-minded. If you deal adequately with all your scrofulous children now, taking them away from their squalid homes, from overcrowded asylums, workhouses, and schools, immersing them in a pure atmosphere, and supplying them copiously—*pace* Professor Koch—with milk and meat free from bovine tuberculosis, with the addition of surgical aid and of such teaching as is needful to guide the growth of their precocious wits, you will relieve much poignant misery, prevent much decrepitude and pauperism, and materially reduce the amount of weak-mindedness in the next generation.

A particular case brings a truth home to us much better than any general statement. Well, I read in the newspapers only a few days ago the sad story of an inquest on a poor cripple, Leonard Paris, who, at nineteen years of age, found what he called "his lonely, miserable existence" unendurable, and so threw aside his crutch and handled the revolver. From six years old he had suffered from hip-joint disease, and although he had been liberally supported by his friends, and had had the benefit of treatment in several hospitals, he remained unrelieved; for months before his death his temperature was feverish. But although his body wasted, his intellect remained vigorous and clear, as the pathetic and thoughtful letters he left behind him prove, while his sense of deprivation became more and more acute, and hope died within him. At last he wrote: "This time I mean to succeed; better a few moments of pain than an unbearable existence, chained by my merciless, hideous fetters to a disease which I know in my inmost heart to be incurable."

The case of Leonard Paris appeals to me with peculiar force, because the most brilliantly intellectual youth whom it has ever been my lot to meet, whose Oxford associates predicted for him a triumphant career, when stricken down by a recurrence of tubercular hip-joint disease, also put out the light

with his own hand. Had he and Leonard Paris had the benefit of sanatorial treatment at the outset of their malady, there is every reason to believe that the tragic issue would have been avoided. Thousands of helpless children around us now, with large anxious eyes and pallid cheeks, are waiting to have their destiny decided. Is it to be health and gleesome toil, or pain and dwindling incapacity? Sentiency is the measure of my sympathy. I cannot feel the same pity for a happy jabbering idiot, unaware of its own defects and with blunted sensibility, that I do for the pretty child that is blemished or racked by disease and cut off from all joyous activity, while its emotions and imaginations are preternaturally vivid. I would plead most earnestly for the early, generous, and scientific treatment of strumous children. That is one of the ways of preventing phthisis. I do not know what Mr. Cockerton would say to sanatorial schools, but this I do know—that our legislators ought to have no hesitation in granting to local authorities all necessary powers for grappling effectually with tuberculosis in the young.

THE ATTITUDE OF FRIENDLY SOCIETIES TOWARDS SANATORIA.

By E. W. BRABROOK, C.B., F.S.A., *Chief Registrar of Friendly Societies.*

Would it be in the interest of industrial societies to contribute towards the erection or maintenance of sanatoria for phthisical patients? In opening the discussion on this question I confine myself wholly to the industrial societies which provide allowances in sickness and sums at death for their members, and which are known as friendly societies, leaving to subsequent speakers to discuss it as it affects industrial insurance companies and other public bodies. Such friendly societies undoubtedly suffer from the liability to tuberculosis experienced by their members—first, by the claims upon them made for sick pay by phthisical patients; second, by premature death from phthisis. If, therefore, that liability could be diminished by the establishment of the sanatoria suggested, it would be to the interest of such societies to contribute to a certain extent towards their erection and maintenance. They have the legal power to do so, for by section 37 of the Friendly Societies Act, 1896, "a registered society or branch may subscribe out of its funds to any hospital, infirmary, charitable or provident institution, any annual or other sum which may be necessary to secure to members of the society or branch and their families the benefits of the hospital, infirmary, or other institution, according to its rules." All that is necessary, therefore, to put this section in action is for the sanatorium to define by a rule what annual or other sum shall be necessary to obtain its benefits for the members of a friendly society and their families. Again, by section 22 of the same Act, a registered society or branch may contribute to the funds and take part by delegates and otherwise in the government of a registered medical society—that is to say, a society for the purpose of relief in sickness by providing medical attendance

and medicine. All that is necessary to put this section in action is for the sanatorium to become registered under the Act. It indeed enables a number of societies to combine together for the purpose of themselves establishing a sanatorium. In this respect, trade unions are placed upon the same footing as registered friendly societies.

This, in a few words, is the answer to the question submitted; but before it can be translated into actual fact other considerations have to be taken into account. The amount of the contribution must be fixed so as to be within the means of the societies.

The societies we are discussing are nearly 29,000 in number, having more than five millions of members, and funds exceeding thirty-one millions of pounds sterling. Figures so grand as these might lead to the inference that here was a fund out of which sanatoria for tuberculosis might liberally be supported; but, when the question is looked into more closely, it will be seen that that inference is not necessarily a sound one. Tuberculosis, though a frequent cause of death, is not the only cause; and it is probable that the care which the friendly societies exercise in the admission of such persons only as members who are healthy and, as far as can be ascertained by medical examination, free from predisposition to the disorder, tends to render the proportion of deaths from that cause among members of friendly societies less than that among the general population. An interesting return of the members who are on reduced sick allowance in the Hearts of Oak Friendly Society throws some light upon this. When a member falls sick, he is allowed in the first instance—say, for six months, or a shorter or longer period—the full weekly sum for which he is assured. That pay is then reduced to half that amount for a further period, and, if the illness turns out to be of a permanent character, is still further reduced. The Hearts of Oak has 2,000 out of its 250,000 members in this condition receiving reduced sick pay, and of these 2,000 only 70, or three and a half per cent., are suffering from phthisis. In other words, only eight per thousand of the members are suffering from illness prolonged beyond the stipulated periods of full and half pay, and in only 28 in every 100,000 is that illness phthisis.

This points to the conclusion that the society, by excluding consumptive persons from membership, obtains for itself, to a very great extent, the protection which a sanatorium might give it. It also seems to show that the amount of contribution which that society could give to a sanatorium without drawing upon its funds applicable to other purposes is but small, being measured by the reduced pay of the few persons for whom the sanatorium would be available.

It is to be noted, on the other hand, that the persons who are now receiving this reduced sick pay, and some of whom have been receiving it for long periods, such as nine and eleven years, have while phthisical patients passed through their periods of full and half pay, during which it would have been worth the while of the society, instead of paying it to them, to have paid it to the sanatorium, in which they might possibly have been cured and saved from being a burden on the society any longer.

With regard to mortality in friendly societies, there is one minor point to be observed: that though the early death of a member causes the claim for burial money to be made before it was expected according to the ordinary expectation of life, it relieves the society from future claims for sick pay, which the member would probably have made if he had lived.

A short and sharp attack of rapid consumption is, therefore, from the purely financial point of view, rather a benefit to the society than otherwise.

There is another recent development of friendly society work which is worth considering in this connection—that of the admission of juvenile members. By an Act passed in 1895, societies were allowed to have members at any age over one year. Obviously, the contributions and benefits of members who are mere children must necessarily be much less than those of older members; and accordingly, before extending to them when they attain the age of 16 or 18 years the full benefits applicable to members who enter at that age, the societies require them to pass a medical examination. If the medical examiner reports that they are not then in good health, it is frequently the practice to exclude them from the society altogether; but this appears to me to be open to grave objection. I think they ought to be continued in the society at the same low rate of contribution and benefit to which they were entitled as juvenile members as long as they wish to remain members of it. To turn out a member when he most wants the aid of the society appears to me to be not equitable, much less friendly. To admit him to greater benefits is a different matter: you may justly refuse that, but cannot, I think, justly determine his existing contract with you. The bearing of these observations on the present question is this: that, at the age when a susceptibility to phthisis is likely to be easily discernible by the medical examiner, the society, if it appears, either reject the member altogether, or continue his membership on a scale of benefit so small as to be that applicable in general to young children only.

The friendly societies and branches in Great Britain and Ireland having 5,217,261 members return the ages of 3,699,804. Of these, 257,068, or 7 per cent., are under 16 years of age; 254,103, or 7 per cent., are between 16 and 20; 2,497,526, or 67½ per cent., are between 20 and 50; 540,005, or 14½ per cent., between 50 and 65; and 151,102, or 4 per cent., over 65.

I have mentioned trade unions as legally entitled to join in the establishment or maintenance of a medical society. It may be worth while to refer to the experience of some of the larger unions with regard to deaths from phthisis. Out of 441 members and wives of members of the Operative Bricklayers' Society who died in 1900, 59, or 13 per cent., are recorded as having died from phthisis; out of 512 members of the United Society of Boiler Makers and Iron Ship Builders, 60, and out of 311 wives of members 39, or about 12 per cent. in both cases, died of phthisis. Out of 265 members of the Amalgamated Society of Railway Servants who died in 1900, 26, or 10 per cent., died of phthisis. Out of 1,146 members of the Amalgamated Society of Engineers, 113, or 10 per cent., and out of 527 wives of members, 66, or 12 per cent., died of phthisis and tuberculosis. It appears, therefore, that, in their very

different occupations, the tax that these diseases claim lies within the narrow limits of from 10 to 13 per cent. of the total number of deaths from all causes.

The report of the last-mentioned trade union—the Amalgamated Engineers—gives a table showing the number and cause of deaths, with the average age at death for each cause. The average ages of those who died of phthisis were 37¾ for the men and 37¼ for the women, while those of all who died from every cause during the year were 52 for the men and 47 for the women. It thus appears that in this union the deaths from phthisis are premature to the extent of from 10 to 15 years; but the consideration already mentioned shows that in a financial point of view the societies do not suffer by this. In the other unions the difference does not appear to be so great. In the Operative Bricklayers' Union, the average age of those dying from phthisis was 39½ years, from all causes 46. In the Boilermakers, members from phthisis 38½, from all causes 47; wives of members from phthisis 35½, from all causes 43. Among the Railway Servants, from phthisis 36½, from all causes 44½. The results in these different trades again correspond very closely, ranging from 35½ to 39½ with regard to phthisis, and from 43 to 52 with regard to deaths from all causes.

The conclusion I have arrived at, in general terms, is that while theoretically the question before us must be answered in the affirmative, it is not likely to be reduced to any appreciable extent into practical operation, as the financial interest of the societies in the matter is small.

[Since the paper was read, I have been interested to find that Mr. Chapman, the representative of the Ancient Order of Foresters, takes a more hopeful view, and thinks that something may be done by co-operation among the friendly societies.]

THE BATTLE AGAINST CONSUMPTION AS A SICKNESS OF THE PEOPLE, BY MEANS OF THE GERMAN WORKMEN'S INSURANCE.

By Privy Councillor BIELEFELDT,

President of the Senate in the Imperial Insurance Department.

Since the year 1891 all hired workmen in Germany, the number of whom was estimated at 12,660,000 in 1898, have been insured against sickness; that is to say, employer and workman contribute in equal parts, so as to provide an annuity to be given to all persons who are incapable of self-support or over seventy years old. The insurance is effected under the supervision of the Imperial Insurance Department, State Insurance Departments, thirty-one insurance institutions territorially limited, and nine special club institutions of the Invalidity Insurance. These insurance offices and club institutions, the capital of which, at the end of 1899, after the ninth year of their existence,

amounted to almost 764,000,000 marks, and which will increase from year to year, take a financial interest in postponing as long as possible the invalidity of the insured with which they are charged, because the later the insured are entitled to the use of the lawful annuity the longer their contributions for invalidity insurance are paid, and consequently the time from the beginning to the end of the payment of the annuity becomes the shorter. For this reason it was of the greatest importance for the officers of the Invalidity Insurance to ascertain the cause of the invalidity insurance made by the Imperial Insurance Department, so as to battle against such causes effectively. The statistics of the causes of invalidity, made by the Imperial Insurance Department, embracing in all 158,462 pensioners, shows by its published tables the following: Of all male workers employed in mining, metallurgy, industry and building, who become invalided up to the age of thirty, more than half suffer from consumption. The proportion of the female pensioners in the same avocations is just as unfavourable at the age of 20–24, while at the age of 25–29 almost half of all invalid women of these avocations are consumptive. Persons engaged in forestry and agriculture do not become invalided in consequence of this illness to so great an extent; nevertheless, out of 1,000 male pensioners employed in agricultural work, there are more than 350 consumptives of the age of 20–24. For the total of the other professions, the proportion of invalid men of the age of 20–30 is such that of 1,000 cases of invalidity 450 are cases of pulmonary consumption, while about a fourth part of all invalid women of the same age and professions are consumptive. These results and the statistics of the causes of death, which are published by the Board of Health for the year 1893, prove that of every 100 persons who died at the age of 15–60 in the German Empire thirty-three were victims to consumption. The officers of the German Workmen's Insurance found that to battle successfully against consumption was one of their most important tasks.

The former Law of Old Age and Invalidity afforded a welcome handle for such endeavours: sect. 12 of the law empowers the insurance institutions to take the method of cure upon themselves in cases of sickness of the insured, and if invalidity is to be feared. The published table shows that only very little use was made in the first instance of this right as to the method of cure, which was not compulsory. But from year to year the recognition of the necessity of a timely cure, as well as the sums of money spent for the purpose, increased, so that at the end of 1900 more than 17,000,000 marks had been spent on the prevention of the invalidity of insured persons. 6,267,211 marks were spent in that purpose in 1900 alone, and of that sum 3,766,761 marks—more than half—were spent on consumptives.

The suggestions of the Imperial Insurance Department as to the methods of cure have greatly influenced the endeavours of the insurance institutions. A circular of March 22, 1896, compiled by the German Workmen's Insurance, has drawn general attention to the importance of the battle against consumption. Three great unions to which the Imperial Insurance

Department and many insurance institutions belonged had at that time encouraged the anti-tuberculosis movement.

1. The German Central Committee for the Establishment of Homes for the Cure of Consumptives:—

   Protectress: Her Majesty the Empress of Germany.
   President of Honour: The late Prince Hohenlohe-Schillingsfürst.
   President: His Excellency the Secretary of State, Count Posadowsky-Whener.
   General Secretary: Surgeon-Major Dr. Pannwitz.

2. The Berlin-Brandenburg Union for Homes for the Cure of Consumptives.

   Protectress: Her Majesty the Empress of Germany.
   President: Privy Medical Councillor Professor Dr. v. Leyden.
   Secretary: Privy Medical Councillor Professor Dr. B. Fränkel.

3. The People's Dwelling Home Cure Union of the Red Cross at Grabowsee.

   President: The Vice-Master of the Ceremonies and Chamberlain of Her Majesty the Empress of Germany, B. v. dem Knesebeck.
   President of the Committee of Experts: Privy Medical Councillor Professor Dr. Gerhard.

The Imperial Insurance Department therefore advised the insurance institutions to avail themselves of the favourable opportunities offered by the exertions of these unions, and in cases of consumption, where the insured is capable of recovery, to demand the aid of the sick clubs and communities concerned for the preservation of the workmen's self-support, by granting treatment for that purpose in sanatoria, which will, if the result realises the expectations, lessen the annuities they are charged with. While a few insurance institutions—the State Insurance Departments of Brunswick and Hanse Towns—began at once to build their own sanatoria for consumptives, the others, reserving their efforts until some experience had been gained, made use of the numerous sanatoria established by unions and communities, the first of which was built by the district of Altona. Mortgages at very low interest were frequently granted by the insurance institutions if the sums of money presented to such clubs by the Central Committee for the Establishment of Sanatoria for Consumptives, by the State Governments, communities, and rich philanthropists, were not sufficient, so as to promote the establishment of sanatoria in all parts of the German Empire.

The favourable experiences up to the year 1899 led to the endeavours of the insurance institutions being extensively supported by the Law of Invalidity Insurance, which came into operation on January 1st, 1900, sects. 18–23, 47. All limitations concerning the extension or mode of treatment which might have existed according to the former law were done away with. Insurance

institutions are now entitled to settle at their estimation the amount and time for which they regard themselves responsible in case of a cure. They may even make an experimental cure on persons who are already pensioned, if the case holds out a prospect that invalidity can be removed. They are at liberty to send the sick persons to hospitals, sanatoria for consumptives, health resorts, convalescent homes, watering places of all kinds, or into private care; and the travelling expenses to and from these places are regarded as belonging to the cure, so that there is a possibility even for the very poorest to regain health in this manner. Nobody can be forced against his will to subject himself to these proffered cures. An influence on the decision of the sick person is only allowed or possible in an indirect manner. If an insured person has abandoned the treatment without a lawful or valid reason and thereby caused his invalidity, the pension can be refused either "for a time" or "altogether or partly." It is clear that by this arrangement a certain pressure may be exercised on consumptives, who are so frequently under the impression that they are quite well before the conclusion of the cure, so that they obey the orders and follow the advice of the physician not to leave the homes or health resorts, etc., too early.

Now it has become the duty of the insurance institutions to go hand in hand with the sick clubs. While the insurance institutions take upon themselves all the duties of the sick clubs to their members so far as they are enjoying a cure, they can demand from the sick associations the sick pay due to the insured, and in the same manner the accident insurance clubs can be charged with the costs which arise to the insurance institutions from any cure, according to the benefit the former derive thereby.

Above all, the new law binds the insurance institutions to assist, with a certain sum of money, those relations of the sick person undergoing a cure who have been supported by his earnings until then, even if the sick person is not in the lawful sickness insurance. This power is chiefly given so as to meet the case of consumptives in sanatoria who, worried as to the support of their families, leave the institution before they are quite cured and, by taking up their professional labour too early, lose the improvement in their health very quickly, and all has been in vain. The insurance institutions are permitted, if it should prove necessary and their means allow of it, to add to the legal minimum sum of support for relations (average: half the sick pay in the sick associations), with the consent of the Bundesrath—(§ 45 of the law). This right has frequently been made use of, and the total sum of relief money paid to relations amounted to 506,772 marks in the year 1900, which amount, in consequence of the new law, was almost three times as much as the sum used for the same purpose in the year 1899, viz., 176,414 marks.

Should the lawful relief for the family of the sick person prove insufficient, charity and spontaneous benevolence take effect on recommendation of the Home Cure Committees. This is not only a question of relieving the family from immediate hunger and care, but also to effect a timely removal of such members of the family who may already bear the disease, and to educate in an hygienic sense the families thus threatened with infection. No special proof

is required for the assurance that such intuition is particularly necessary in cases of consumption. It is mainly from this point of view that the Imperial Insurance Department has declared in a circular of May 29th, 1897, that accident professional associations and invalidity insurance institutions should go hand in hand with the Organisations of the "Vaterländischen Frauenverein for the purpose of aiding the sick"—this was particularly emphasized by President Goebel at the Delegation Meeting of the "Vaterländischen Frauenverein" at Berlin, March 30th, 1898—and it approves of the insurance money being spent for such a purpose according to the degree of necessity and the surety of equivalent indemnification by the associations. Numerous insurance institutions (the first being the Insurance Institution Brandenburg) and professional associations thereupon regarded it as advisable to assist the Frauenverein (Women's Union) of the Red Cross by annual supports, as this union strives for the establishment of parish sisters or nurses and stations for the attendance on the sick. Thus the blessing of these stations will, like a net, spread itself further from year to year, and it is to be hoped that in time they will become of the utmost importance for the due reception of the consumptive in a cure home or the like, and a great help in guarding the family from want and infection, as also for the preservation of the success once gained after the dismissal from any place of cure. It is particularly in the country, where the physician is too great a stranger in the families, that the parish sisters or nurses form an important link between the physicians, the sick clubs, the accidental professional associations, and the invalidity insurance institutions.

The efforts of the insurance institutions concerning the method of the cure have had a favourable influence on the position of the sick club to an illness such as consumption, in which case they were hitherto powerless. What enormous sacrifices the sick clubs were compelled to make for their consumptive members without any prospect of success, is clearly described in the Memorial "for the Battle against Consumption" presented to the Imperial Insurance Department in the year 1898 by the Central Commission of the Sick Associations of Berlin and Environs. According to this memorial, numerous consumptives have each received more than 1,000 marks sickness pay and other assistance within two years. It was hence clear that the sick clubs would gladly and thankfully accept the help of the insurance institutions in this direction. The sick clubs take a particular interest in getting all members whom their physicians suspect of being consumptive carefully examined at once.

At the suggestion of the Sick Associations, large cities frequently arrange opportunities for the detection of pulmonary consumption, and conferences are often held for the same purpose; one particular feature of these "information stations or offices" is the examination of the sputum of the sick, free of charge; and further, the physicians are informed of all that is necessary for the diagnosis in carefully drawn up question sheets. The sick persons who are proposed for a cure by the physicians of the sick associations are subjected to another examination by the confidential physicians of the insurance institutions, and where it appears that too many inappropriate cases are being sent

to the cure homes, the special attention of the physicians and sick clubs is drawn to the necessity of making a more careful choice among the sick and of only considering such cases where a cure promises to result and where the illness is in its first stage. See, for instance, the circular of the Insurance Institution of Baden to the Physicians in the Grand Duchy of Baden of July 7th, 1901.

In addition to this, the sick clubs, professional associations, and insurance institutions take every available opportunity of enlightening the working classes regarding the great danger that threatens them in consumption and as to the protection possible against it. By the aid and at the cost of the German Workmen's Insurance, millions of popular publications, such as the "Tuberkulose-Merkblatt" composed by the Imperial Board of Health, and the prize work of the Berlin Tuberculosis Congress by Dr. Knopf, were made accessible to the working classes. Sick clubs and unions for the public welfare cause popular lectures to be held on the significance of pulmonary consumption in many places. Such lectures in continuation have been introduced with a good result by the very able Central Commission of the Sick Clubs of Berlin and its Environs. The great Territorial Sick Club of Leipzig and its Environs deserves special mention for the enlightenment it gives its members as to the danger of pulmonary consumption. Consumptives who return from sanatoria cured and improved are of great assistance in this sense. These people have recognised the necessity of hygienic conditions of life for the recovery and preservation of their health. The strict discipline in the home has taught them to observe the medical orders, and, for reasons of self-preservation that are alive in everybody, will insist upon the abolition of many grievances in hygienic respects among their families and friends. At all events, if all the factors just mentioned act and work together upon the same classes, the public must be roused from its indolence to a higher perception of this most devastating plague of the people.

Convalescent homes and places where convalescents may stay for the day, so-called "recreation places," have been established supplementary to the treatment and cure in sanatoria. It is consumptives and other people with chronic illnesses that are benefited by these two means of treatment. The insurance institutions have partly established and set at work convalescent homes of their own, while those recreation places of a plainer style, which have proved beneficial in the vicinity of large cities, join with the sick clubs. In this manner the People's Dwelling Home Cure Union of the Red Cross at Berlin, to whom the first "Home for Consumptives" at the Grabowsee belongs, has, by the aid of the Insurance Institution of Berlin, established no less than three such "recreation places" near the capital for members of the sick clubs. All these recreation homes are much frequented by the working population.

It is very often the case that the insurance institutions take it upon themselves to put cured or improved consumptives into healthy circumstances of life. For instance, sect. 18 of the Rules for the Cure Home "Albrechtshaus," belonging to the State Insurance Institution of Brunswick, provides that:—"At least three weeks before the dismissal from the Cure Homes, every patient has to request the inspector of the house to apply for

work at the appropriate place. It is the object of the Cure Home to restore the capability for work; and it is necessary to make use of this capability at once on the return home, so that absence of means for maintenance and want that would follow do not cause the advantage to be lost, which was gained by the successful cure at the Home." This shows again very clearly what were the interests which prompted the Workmen's Insurance to interfere with the deferment of the invalidity of the insured.

The insurance institutions have indirectly taken these interests into consideration by investing their great capitals, which at the time were not required, in a manner which would chiefly benefit the working classes. Above all, the investments made for healthy workmen's dwellings deserve to be mentioned. The published tables show that 5,700,000 marks, which sum was lent out at a low percentage (mostly 3 per cent.) for the purpose of building working men's dwellings in 1894, had risen to more than 78,000,000 marks by the end of 1900. How many insured persons have really been preserved from consumption by healthy dwellings cannot of course be stated in figures, but for anyone who has thrown a glance on the sad dwellings of the working classes—in particular in large cities and in families where there are many children—it is quite clear that there is no more effective means of battling against consumption than the provision of healthy dwellings. (Compare Landrath Dr. Heydweiler-Lüdenscheid's account at the general meeting of the German Central Committee, 1901, of "The Battle against Consumption by the Provision of Healthy Dwellings.")

Even in such cases, where all preventions and cures of the insurance institutions are of no avail, the Workmen's Insurance proves to be a blessing for the poor consumptives and their families. By being granted an invalidity annuity they are at least preserved from bitter want; but as the insurance institutions have a right to establish Invalid Houses for such pensioners who are willing to be maintained free of charge and then renounce their annuities in ready cash, a possibility is thereby ensured of giving incurable consumptives a suitable care to their life's end, and what is even still more important, by this arrangement the great danger of infection for the other members of the family is removed. Several insurance institutions have already begun the establishment of such Invalid Houses, and it will depend upon the experience of a few years whether this arrangement is to be extended and so become an effective protection against consumption.

It has been mentioned several times that the treatment of consumptive German workmen takes place mainly in special Cure Homes (Sanatoria) for Consumption. Of 11,094 sick persons in the year 1900 whom the insurance institutions have put under medical treatment, almost 9,000 were sent to sanatoria, while 1,431 have sought recovery in bathing places and 653 in hospitals; the 9,000 consumptives were put into 63 different sanatoria. As the interesting account given in the spring of 1901 by the General Secretary of the German Central Committee, Dr. Pannwitz, shows, the number of sanatoria is still increasing. The insurance institutions, which formerly had not built their own Cure Homes or Sanatoria for Consumptives, were

compelled, by the perception of the growing necessity and the recognition of the good results that could be gained, to fill up the existing gap. Sanatoria for consumptive women are much needed. To 6,892 men treated in sanatoria in the year 1900 there were only 2,050 women; but within a very short time insured consumptive women will also be considered. Altogether there are 43 People's Cure Homes and 16 private Sanatoria, that also receive consumptives of the working classes on reduced terms, at work in Germany. Within a year 19 more People's Cure Homes will be opened, while there are another 16 still in the project. Supposing each bed to be occupied four times yearly, Germany has 20,000 places for consumptives at its disposal every year.

The main principles of hygiene and dietary treatment are applied in the sanatoria, which consist above all in a plentiful nutrition, the enjoyment of fresh air, hardening of the whole system, and in hygienic education.

The costs for the treatment of the insured workman—with very few exceptions—are paid by the insurance institutions and club institutions of the Invalidity Insurance. The sick themselves have naturally not the means for an expensive long-lasting cure. The means of the "Provident Unions" are also rarely ever sufficient, and the sick clubs, which have a fixed time of thirteen weeks during which they grant the sick-pay, find this, even if they do not mind the great expense in special cases, an insurmountable obstacle for taking the method of the cure of consumptives upon themselves.

As the published tables show, the average annual costs of the single case of treatment amount to:—

	1897	1898	1899	1900
	Marks.	Marks.	Marks.	Marks.
For men	296·00	307·50	310·31	345·13
For women	350·44	340·95	318·04	321·12
And the costs per day:—				
For men	4·05	4·20	4·25	4·78
For women	4·04	4·12	4·03	4·00

According to the above, the costs for the single case have increased from 1897–1900 for men by 49 marks, while they have decreased for women by 29 marks. As to the daily costs for treatment, no great difference shows itself for women in the four years, while with men we see an increase of the daily cost of 73 pfennige, although the average duration of the cure has remained about the same (72 to 73 days). A longer time for the cure has, however, always been necessary for women than for men, although it is not to be forgotten that there is a gradual diminution—from 87 days (1897) to 80 days in the year 1900.

If one compares these sums with those spent on an average on the treatment of other illnesses, it is striking that the expenses for pulmonary consumptives have been twice as large as for other sick persons. These great differences arise chiefly from the fact that men and women suffering from consumption require an extra strengthening diet, and therefore their maintenance averages one mark more per day; and also, in consideration of the nature of the illness, a longer time is allowed for the cure—21 to 31 days more

ı for other sick persons. In spite of this, the insurance institutions are : at a disadvantage; taking the year 1899 for instance, where there was an erage expense of 310 marks (men) and 318 marks (women) for each case, much better than if they had a pension of 132 marks to pay to each ve for 2½ years.

: question as to the advantage of this method of cure for consumptives only be answered by reliable and comprehensive statistics as to the effects of the results gained. Since 1897 such a calculation is yearly by the Imperial Insurance Department; the one for the years -1900, which comprises the treatment of a total of 27,176 consumptives, is dedicated to the Congress, and is at the disposal of the members of the Congress in a German or English edition. For the possibility of a subsequent control of the results gained, the insurance institutions will ascertain for five consecutive calendar years how many of the men and women who were treated with a good result, have received the invalid pension up to the end of the year in which they were under treatment and also during the four following years, or who, in spite of having entered upon invalidity, did not receive a pension; also, how many persons have died within those years or have been under treatment again. Cases of repeated treatment—and their number amounts to as much as 15 per cent. in the second year and to about 16 per cent. in the third year after the first treatment of all successful cases—are not regarded as having been successful, but as a failure. After the conclusion of a repeated treatment they are counted as special cases, and are then controlled as regards continuance of a possible success like cases treated for the first time. So as to put the duration of success on a sound foundation free of all cloaking, cases which could not be put under a subsequent control will be deducted from the total of all cases that have been treated. The insurance institutions make all necessary inquiries among physicians, authorities, etc., as to the fate of persons who were successfully cured, and a reliable, systematic exchange of information takes place among the different insurance institutions, on all remarkable facts. In the sense of the calculations all such persons are regarded as having been treated with a "successful result" where incapability of self-support according to § 5, sect. 4 of the Invalidity Insurance Law—that is, lawful incapability of self-supporting—is not to be feared.

On consideration of the before-mentioned points of view, the statistics for the years 1897, 1898, 1899, and 1900, on the number of consumptive men and women that was treated, have led to the result which is expressed on the two published tables of the result of the treatment. According to these, the first results at the conclusion of the treatment vary in the four years between 68–74 per cent. of all men under treatment, and between 68–73 per cent. of all women.

The years 1898, 1899, and 1900 show a better result on the whole, as regards duration and success, than the year 1897, which must probably be put down to a more careful choice of material among the sick and to the experience gained in 1897. While of 100 men and women who were taken under treatment in the year 1897 and subsequently controlled, the result of the cure had only lasted for two years after the year of treatment with 27,

relatively 36 persons, the result of the treatment begun in 1898 has been a better one, viz., of 100 men and women under treatment in 1898, and subsequently controlled, 38, relatively 44, were still capable of self-support at the termination of the same space of time, that is, at the end of 1900. The fact is worthy of being mentioned that at the end of the third year after the treatment of 1897 there were only very few cases where the result was not lasting, in comparison with the year before. We see that of 100 men taken under treatment in 1897 and controlled, there were still 27 in 1899 and still 26 in 1900 capable of self-support, and that with the women the percentage of those who remained capable of self-support was 36 both in 1899 and 1900. Precise conclusions cannot be drawn before the sick of the following years of treatment show a similar result as above after a lapse of three years. Nevertheless, this sudden stability of success, as compared with the remarkable want of success of the two first years, is very striking.

Throughout, consumptive women show a more favourable lasting effect of the cure than consumptive men.

If the above success in the treatment of consumptives is compared with that of other cases of sickness, no differences remarkably unfavourable to the consumptives appear before the termination of the second year after that in which the treatment was begun; but here again it is chiefly consumptive men—not women—who compare unfavourably with those treated for other illnesses.

These, gentlemen, are the essential results of the battle against consumption by the obligatory German Workmen's Insurance, which institution has been joined, as we have seen, by communities, institutions for the public welfare, and private people, all endeavouring to take a supplementary part, and with great success. The opinion may be expressed, after the experience of several years, that an effective battle against consumption among the working classes would have been altogether impossible without the Workmen's Insurance in Germany. By, however, the support of the powerful pecuniary resources and legal social regulations of this Insurance, we will, we are convinced, be ultimately victorious.

Dr. Reiche (Lübeck): I beg to make a few remarks on the results of the sanatorium treatment of phthisis. From the very beginning the Insurance institute of the three Hanse towns took up the idea of sending consumptive workmen to the sanatoria with the intention to restore their impaired or endangered working power. We are, therefore, already able to bring forward fairly extensive results. Only such cases underwent sanatorium treatment as, after medical examination, were thought to have a good chance of regaining, by a prolonged stay in the sanatorium, their full working capability. The treatment lasted on the average eleven weeks, in some cases up to thirty weeks. Patients who after a short stay left the sanatorium are omitted from the statistics. In some cases a second and even a third course of treatment was granted. In referring to these statistics, I wish to point out again that all patients were workmen earning under £100 a year. They were obliged to return after treatment to their former mode of life, to dwellings very often unsanitary, to work very often under unhygienic conditions, to a diet frequently

GENERAL VIEW OF CONSUMPTIVES TREATED IN SANATORIA BY THE "LANDES-VERSICHERUNGSANSTALT DER HANSESTÄDTE," WHO AFTER MEDICAL EXAMINATION WERE BELIEVED TO BE ABLE TO REGAIN THEIR FULL WORKING CAPACITY.

They all belonged to the working classes and after treatment returned to their former mode of life.
Treatment lasted from 5 to 30 weeks, on an average 11½ weeks.

	1893				1894				1895				1896				1897				1898				1899				1900			
Number of patients	4				129				368				473				468				571				549				692			
	tot.	%	m.	fem.	tot.	%	m.	fem.	tot.	%	m.	fem.	tot.	%	m.	fem.	tot.	%	m.	fem.	tot.	%	m.	fem.	tot.	%	m.	fem.				
Died in sanatoria	1		–	1	1	0·85	1	–	1	0·28	1	–	–	–	–	–	1	0·22	1	–	1	0·18	1	–	–	–	–	–				
Died after discharge	3		3	–	60	50·85	55	5	144	40·90	127	17	101	22·75	85	16	73	16·30	55	18	87	15·68	69	18	42	7·86	27	15				
According to inquiries and medical examinations in the beginning of 1901: unable to work ...	–		–	–	19	16·10	19	–	27	7·67	18	9	27	6·08	19	8	28	6·25	16	12	45	8·10	32	13	56	10·49	38	18				
partly able to work	–		–	–	7	5·93	4	3	35	7·67	13	14	35	7·88	17	18	37	8·26	15	22	67	12·07	29	38	77	14·42	43	34				
thoroughly able to work	–		–	–	31	**26·27**	24	7	153	**43·48**	106	47	281	**63·29**	176	105	309	**68·97**	165	144	355	**63·97**	218	137	359	**67·23**	227	132				
	4		3	1	118		103	15	352		265	87	444		297	147	448		252	196	555		349	206	534		335	199				
reports could be obtained of ..	–	–	–	–	11	–	7	4	16	–	5	11	29	–	13	16	20	–	10	10	16	–	8	8	15	–	13	2				
	4		3	1	129		110	19	368		270	98	473		310	163	468		262	206	571		357	214	549		348	201				
Second course of treatment was necessary for	–	–	–	–	25	13·59	23	2	42	7·95	36	6	70	9·84	48	22	82	10·65	46	36	68	7·49	49	19	30	3·56	19	11	3	0·29	3	–
A second and third course of treatment was necessary for	–	–	–	–	3	1·63	3	–	3	0·57	3	–	2	0·28	2	–	1	0·13	1	–	–	–	–	–	–	–	–	–	–	–	–	–

Reprinted (and translated) from "Die Handhabung des Heilverfahrens bei Versicherten (§ 18, I. V. G.) durch die Landes-Versicherungsanstalt der Hansestädte im Jahre 1900 und Ergebnisse des Heilverfahrens bei lungenkranken Versicherten bis Ende 1900" (Lübeck, Landes-Versicherungsanstalt).

insufficient and irregular. In spite of all these drawbacks, a good deal of the working power restored through the sanatorium treatment was saved and retained until now; for instance, about 26 per cent. of the cases treated in the year 1894—more than six years ago—are still in a position to work and earn their bread. These figures (see table annexed) are obtained by inquiries, and verified whenever possible by the medical examinations to which all our former sanatorium patients are summoned during the first three months of every year. The medical examinations proved that not all of the patients registered as fully and safely able to work were cured in the medical point of view—cures of consumption are of comparatively rare occurrence—but they were cured in the economical sense, able to maintain themselves and their families by their own manual work. I think we may look upon these results with some satisfaction. They are not obtained by the peculiarities of the open-air treatment in the sanatoria alone, but firstly and principally because patients have learned, since sanatoria have become available, to apply for help at an early stage of their illness, and secondly, because we are able to give them the advantage of a greatly prolonged treatment. We further trust that the treatment was beneficial to others than the actual sufferers themselves. By impressing on them the principles of a rational method of living, the importance of absolute cleanliness with regard to their sputum, we afford protection to those who associate with them and to the community at large.

SURGEON-MAJOR DR. PANNWITZ (Berlin): We have gathered from the report of Privy Councillor Bielefeldt that the crusade against consumption and other forms of tuberculosis in Germany is making great progress through the law for the insurance of sick and invalided workmen. In Germany people are of opinion that the crusade against tuberculosis can only be carried to a successful issue when everybody understands that consumption is an infectious disease, which is preventible through prophylaxis, and curable through proper treatment. All other measures, such as compulsory notification, the better housing of the poor, and the proper care of children, etc., are the results of this conviction; they follow as a matter of course. These facts are disseminated by the German Central Committee for the Erection of Sanatoria for Consumptives, whose efforts are supported in an effectual manner through popular pamphlets, as well as through the medical press and the daily papers, to all of which we are greatly indebted. But these theoretical propaganda do not change public opinion quickly enough. It requires practical demonstration as to what is of special importance in order to give the people what Dr. Brouardel, of Paris, called a few days ago "l'éducation anti-tuberculeuse." The German Central Committee for the Erection of Sanatoria for Consumptives was, we claim, the first to disseminate the idea of the erection of sanatoria, and of the housing of the tuberculous on hygienic lines, so that the patients are in the proper sense of the word educated in accordance with Dr. Brouardel's ideas. But we are convinced that, like every other education, this special education is not possible without the assistance of women, and the women's associations, which obtain with us in such a prominent manner in the German women's societies of the Red Cross, of which one of its guiding representatives, Ihre Excellenz Frau von

Boetticher, is present at this Congress. As in the family the woman, the mother, looks after the family education, even so do the women's societies take a similar place in the social life. We would strongly urge this country to follow our German example, and to work hand in hand in the struggle against tuberculosis with women and women's societies.

INDUSTRIAL INSURANCE AND THE PREVENTION OF TUBERCULOSIS.

By FREDERICK L. HOFFMAN,
Statistician of the Prudential Insurance Company of America.

Introduction.

The intimate relation of life insurance companies to problems and questions of preventive medicine and modern sanitary science is not a matter of opinion but of fact, and while thus far Industrial companies have not directly become interested in measures of reform, to my way of thinking the time is not far distant when, apart from the direct benefits of the system of Industrial insurance, there will be indirect results of vast importance to society as a whole. In full recognition of this idea, the Prudential Insurance Company of America has cheerfully, and to the extent of its ability, complied with the request of the President of the State Section to furnish, first, a statistical exhibit of its experience with special reference to the mortality from tuberculosis, and second, a statement of fact and suggestions in answer to the question as to whether it would be to the interest of Industrial insurance companies to contribute towards the erection and maintenance of sanatoria for the treatment of policy-holders suffering from tuberculosis in its early stages. Very limited in time, I have not been able to do full justice to these two requests, but I have been able to bring together a considerable amount of information and statistical data not previously presented to the public at gatherings of this kind.

Nature and Objects of the Statistical Exhibit.

The statistical portion of our exhibit for the Museum includes eighteen specially prepared diagrams* and charts exhibiting the most important facts, first, as to the extent of tubercular diseases in the United States; second, as to the mortality experience of the company; third, as to the rejection experience of the company, with reflections on the value of family history in the diagnosis of doubtful cases; fourth, as to the physical condition of applicants and the importance of physical characteristics in determining a liability to tuberculosis; while, finally, I have added a diagram showing the financial interest of our company in the question of preventing and reducing the now excessive mortality from tubercular diseases.

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* These admirable diagrams, which are not here reproduced, have been presented by Mr. Hoffman to the Parkes Museum, Great Margaret Street, London, W., where they may now be consulted.—Ed.

I must needs be brief in my discussion of the essential facts graphically set forth in this series of charts and diagrams, and I shall as far as possible avoid the use of statistical data, since in all cases the actual and relative facts have been added to the graphic illustration. It, however, is necessary for me to explain, at the outset, that we have not in the United States a general system of mortuary registration, such as you have in England, and hence the first four diagrams are limited to the returns for such States and cities as could most readily furnish the necessary information for a period of thirty years.

The Mortality from Consumption in the United States.

The first diagram refers to the general mortality from consumption in five eastern States and twelve additional cities, with an aggregate population in 1899 of 18,000,000. It is shown that for the past three decades the mortality rate for consumption has constantly and very considerably declined, so much so that against an average rate of 33 per 10,000 of population in 1871, the rate at the present time is only 21. On the assumption that the

TABLE I.

Mortality from Consumption in the United States.

Five Eastern States and Ten Other Cities, 1871–1900.

Years.	Population.	Deaths from Consumption.	Rates per 10,000 Population.
1871	4,404,967	14,650	33·3
1872	4,765,992	15,472	32·5
1873	4,612,606	15,429	33·4
1874	4,720,895	14,759	31·3
1875	4,775,368	15,497	32·5
1876	5,921,544	18,671	31·5
1877	6,041,306	18,165	30·1
1878	6,164,223	18,691	30·3
1879	6,352,627	18,788	29·6
1880	6,483,854	20,023	30·9
1881	8,066,394	25,057	31·1
1882	8,430,591	25,802	30·6
1883	8,537,565	25,657	30·1
1884	8,751,073	25,378	29·0
1885	8,900,540	25,712	28·9
1886	9,225,776	25,879	28·1
1887	9,489,916	25,786	27·2
1888	9,685,789	25,368	26·2
1889	10,048,738	25,115	25·0
1890	10,345,516	27,052	26·1
1891	10,607,644	25,737	24·3
1892	10,877,229	26,323	24·2
1893	11,154,508	26,089	23·4
1894	11,438,706	24,996	21·9
1895	11,732,586	25,826	22·0
1896	12,027,286	25,681	21·4
1897	12,330,403	24,830	20·1
1898	13,934,296	28,146	20·2
1899	14,301,595	29,302	20·5
1900	7,570,534	16,056	21·2
1871–85	96,929,545	297,751	30·7
1886–1900	164,770,522	382,186	23·2

States: Vermont, Massachusetts, Rhode Island, Connecticut, New York.
Cities: New York, Chicago, Philadelphia, St. Louis, District of Columbia, Baltimore, Richmond, Charleston, Atlanta, New Orleans.

rate for the area under observation applies approximately to the country as a whole, the present annual number of deaths from consumption in the United States is about 160,000; and if to this number we add the deaths from related causes—that is, from other tubercular diseases, chronic pneumonia, chronic bronchitis, and laryngitis—we have about 200,000 deaths from tubercular diseases per annum in the United States at the present time. While the reduction in the death rate is a gratifying evidence of medical and sanitary progress, it is equally clear that an immense amount of work remains to be done—in fact, most, since the results thus far attained are in a large measure to be accounted for by the natural tendency on the part of every disease to run its course after the most favourable conditions for its earlier existence have passed away.

The Mortality from Consumption by Sex and Age.

If we now examine into detail the general fact that the mortality from consumption has decreased during the past thirty years, we find that first in

TABLE II.

Mortality from Consumption in the United States, 1871–1900.
Five Eastern States and Three Other Cities.

	White Males.			White Females.		
	Population.	Deaths from Consumption.	Rate per 10,000.	Population.	Deaths from Consumption.	Rate per 10,000.
1871	1,689,037	5,930	35·1	1,791,463	6,368	35·5
1872	1,726,709	6,235	36·1	1,831,965	6,769	36·9
1873	1,765,308	6,073	34·4	1,873,475	6,682	35·7
1874	1,804,858	5,949	33·0	1,916,015	6,470	33·8
1875	1,845,444	6,288	34·1	1,959,555	6,790	34·7
1876	1,930,987	6,341	32·8	2,048,855	7,011	34·2
1877	1,967,714	6,051	30·8	2,086,411	6,890	33·0
1878	2,005,238	6,143	30·7	2,124,749	7,222	34·0
1879	2,043,593	6,279	30·7	2,163,878	6,972	32·2
1880	2,082,471	6,699	32·2	2,204,375	7,324	33·2
1881	2,576,320	8,413	32·7	2,717,257	9,158	33·8
1882	3,513,765	10,064	28·6	3,366,572	11,005	32·7
1883	3,278,083	9,894	30·2	3,433,590	10,939	31·9
1884	3,343,697	9,907	29·6	3,501,192	10,717	30·6
1885	3,075,257	9,357	30·4	3,223,972	10,213	31·7
1886	3,494,615	10,522	30·1	3,649,051	10,497	28·8
1887	3,580,033	10,548	29·5	3,731,372	10,474	28·1
1888	3,667,697	10,444	28·5	3,815,512	10,360	27·2
1889	3,757,642	10,222	27·2	3,901,825	10,030	25·7
1890	3,854,731	10,875	28·2	3,985,114	10,621	26·7
1891	3,941,506	10,302	26·1	4,085,598	9,783	23·9
1892	4,035,831	10,417	25·8	4,183,159	10,115	24·2
1893	4,132,553	10,440	25·3	4,283,181	9,732	22·7
1894	4,231,331	10,017	23·7	4,385,122	9,281	21·2
1895	4,233,072	10,448	24·7	4,490,778	9,590	21·6
1896	4,433,699	10,237	23·1	4,595,247	9,487	20·6
1897	4,363,310	9,879	22·6	4,535,174	8,853	19·5
1898	5,103,911	11,822	23·2	5,301,177	9,905	18·7
1899	5,234,602	12,485	23·9	5,436,801	10,185	18·7
1900	2,407,011	6,601	27·4	2,511,184	4,604	18·3
1871–1885	34,648,481	109,623	31·6	36,243,324	120,530	33·3
1886–1900	60,471,544	155,259	25·7	62,890,295	143,527	22·8

States: Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey.
Cities: New York, Philadelphia, District of Columbia.

the order of importance we must take account of the incidence of sex and age. The second diagram of the series points out a most important and to my mind most significant fact, which must needs have weight in considerations of the general subject of the prevention of this disease. You will observe that in 1871 the mortality of the sexes was practically the same, and until

TABLE III.

Mortality from Consumption by Age and Sex.

Three States and Two Cities, 1871-1900.

MALES.

Period.	Population.	Deaths.	Rate per 1,000.	Population.	Deaths.	Rate per 1,000.
	0-20.			**20-39.**		
1871-75	2,872,190	3,345	1·2	2,432,495	11,706	4·8
1876-80	3,390,504	3,407	1·0	2,917,717	12,605	4·3
1881-85	3,764,290	3,737	1·0	3,341,410	15,667	4·7
1886-90	4,070,571	3,678	0·9	3,732,867	16,783	4·5
1891-95	4,224,855	3,385	0·8	4,150,495	16,104	3·9
1896-1900	4,189,208	3,297	0·8	4,211,062	17,684	4·2
	40-59.			**60-ω.**		
1871-75	1,318,365	6,426	4·9	459,755	3,246	7·1
1876-80	1,590,509	6,948	4·4	572,300	3,209	5·6
1881-85	1,801,810	8,457	4·7	664,180	3,644	5·5
1886-90	2,000,715	8,796	4·4	736,182	3,380	4·6
1891-95	2,107,710	8,397	4·0	734,280	2,922	4·0
1896-1900	2,105,286	9,493	4·5	692,240	3,142	4·5

FEMALES.

Period.	Population.	Deaths.	Rate per 1,000.	Population.	Deaths.	Rate per 1,000.
	0-20.			**20-39.**		
1871-75	2,957,215	4,749	1·6	2,381,010	13,383	5·6
1876-80	3,483,276	5,149	1·5	3,196,109	15,251	4·8
1881-85	3,844,110	5,431	1·4	3,621,510	17,582	4·9
1886-90	4,122,843	5,167	1·3	4,007,008	16,630	4·2
1891-95	4,324,360	4,611	1·1	4,386,240	15,069	3·4
1896-1900	4,222,210	4,072	1·0	4,361,048	14,853	3·4
	40-59.			**60-ω.**		
1871-75	1,326,995	5,716	4·3	536,810	3,319	6·2
1876-80	1,617,828	6,147	3·8	657,932	3,320	5·1
1881-85	1,866,605	6,935	3·8	768,070	3,489	4·5
1886-90	2,071,493	6,258	3·0	851,335	3,026	3·6
1891-95	2,183,790	5,557	2·5	863,520	2,161	2·5
1896-1900	2,114,271	5,394	2·6	814,055	2,169	2·7

States: Vermont, Massachusetts, Rhode Island.
Cities; New York, District of Columbia.

1885 the decline in the rate was about equal for both sexes, but for reasons which are yet to be fully explained, and which cannot be discussed in this paper, a change occurred in 1885–1886 by which the rate of mortality from consumption among females decreased so much more rapidly that by 1900 the sexes contrasted in a marked manner—so much so, that while the mortality from this disease was 18 per 10,000 for women, it was 27 per 10,000 for men. Partly, no doubt, perhaps largely, this result must be attributed to the improved conditions of the industrial masses in the United States during the past fifteen years—an improvement which has unquestionably been of far more benefit, as to health and longevity, to the female element of the population than to the male. The point is one which, it would seem to me, is deserving of careful consideration, since a knowledge of the forces by which the liability to consumption has been diminished so considerably among women ought certainly to be of great value in diminishing the mortality from this disease among men. The facts are more fully set forth in the next diagram, in which I have made a comparison of the mortality of the sexes at different age periods.

The conclusions derived from the preceding diagram are fully confirmed by this detailed study of the age and sex incidence of the disease, and, as you will notice, the decline in the mortality of males has been small at all ages at which the disease is of most importance to Industrial companies, and practically the decline in the death rate is confined to ages over 60, at which but few risks are accepted.

Among females it is clear that the factors or forces tending to reduce the mortality from consumption have operated at all ages over 20 to about the same degree, and at all the important age periods the disease is now far less common among women. It is not necessary to further discuss these facts, except to point out that the age periods among males at which consumption is still a factor of such vast importance and at which practically no decline has been effected during three decades, are the periods of life where a large number of our working population are employed in unhealthy trades, to which we may reasonably attribute a considerable portion of the still excessive mortality from tubercular diseases among males. This point will be more fully discussed from data furnished by our Industrial mortality experience.

The Mortality from Consumption by Race.

Next to sex and age as the element of most importance affecting the mortality from consumption in the United States, we must consider race, and I have been able for a few cities to obtain the needed information in the construction of the diagram of comparative mortality of the white and coloured population. Unfortunately, the returns are very limited, and for the earlier years of the period too fragmentary to be indicative of absolute accuracy; but I may be permitted to add that the conclusions derived from this diagram are so fully in harmony with the conclusions based on a very comprehensive investigation of the entire subject of negro mortality, that I have full confidence in the results brought out by this comparison. You will observe that the

death rate for both races has declined, but the difference in the rates has remained practically the same, and thus we have it that at the present time the consumption mortality rate for the white population of the cities, stated as

TABLE IV.

MORTALITY FROM CONSUMPTION IN THE UNITED STATES, 1871–1900.

WHITE AND COLOURED POPULATION OF SIX CITIES.

	White.			Coloured.		
	Population.	Deaths.	Rates per 10,000.	Population.	Deaths.	Rates per 10,000.
1871	1,003,641	4,194	41·8	63,441	365	57·5
1872	1,027,932	4,274	41·6	64,560	406	62·9
1873	1,052,820	4,184	39·7	65,711	382	58·1
1874	1,078,320	4,054	37·6	66,893	295	44·1
1875	1,072,838	4,126	38·5	42,747	232	54·3
1876	1,203,940	4,459	37·0	96,022	563	58·6
1877	1,386,665	4,804	34·6	153,884	955	62·0
1878	1,418,931	5,242	36·9	157,204	1,013	64·4
1879	1,487,871	5,205	35·0	187,948	1,134	60·3
1880	1,521,613	5,600	36·8	191,984	1,252	65·2
1881	1,550,972	6,135	39·6	184,787	1,192	64·5
1882	1,600,490	6,155	38·5	199,181	1,288	64·7
1883	1,662,126	6,085	36·6	221,847	1,357	61·2
1884	1,700,165	6,221	36·6	226,432	1,451	64·1
1885	1,697,171	6,064	35·7	201,146	1,304	64·8
1886	1,779,053	6,317	35·5	235,987	1,430	60·6
1887	1,819,957	6,077	33·4	240,968	1,322	54·9
1888	1,815,757	5,995	33·0	214,714	1,189	55·4
1889	1,904,819	5,963	31·3	251,362	1,445	57·4
1890	1,948,763	6,328	32·5	255,672	1,410	55·1
1891	2,003,000	5,977	29·8	259,021	1,395	53·9
1892	2,055,704	5,910	28·7	263,542	1,425	54·1
1893	2,110,936	5,935	28·1	268,026	1,402	52·3
1894	2,167,730	5,431	25·1	272,686	1,435	52·6
1895	2,226,070	5,997	26·9	277,415	1,384	49·9
1896	2,286,068	5,169	22·6	282,238	1,468	52·0
1897	2,347,834	5,591	23·8	287,218	1,479	51·5
1898	3,684,123	8,439	22·9	312,770	1,491	47·7
1899	3,794,710	8,785	23·2	318,707	1,510	47·4
1900	3,833,261	8,685	22·7	259,635	1,256	48·4
1871–85	20,465,495	76,802	37·5	2,123,787	13,189	62·1
1886–1900	35,777,785	96,599	27·0	3,999,961	21,041	52·6

Cities: New York, District of Columbia, New Orleans, Atlanta, Charleston, Richmond.

being 23 per 10,000, contrasts with the rate for the coloured population of 48 per 10,000, an excess in the negro mortality of over 100 per cent. I shall have occasion to further refer to this phase of the problem of disease prevention in discussing the results of our Industrial experience with negro risks.

GENERAL CONCLUSIONS.

The general conclusions to be drawn from these facts may be stated as follows: Tuberculosis is at the present time the cause of about 200,000 deaths per annum in the United States. The decline which has taken place

in the death rate from this cause during the past thirty years has been considerable, but it appears that the male population at ages 20 to 60 has remained almost wholly unaffected, while for the females the decline in the death rate has been considerable at all age periods. The white population is shown to be subject to the disease at a much lower rate than the coloured, but for both races there has been a decline in the death rate during the three decades covered by this investigation. Hence the general conclusion and recommendation that efforts towards the prevention of tubercular diseases be especially directed to the male population at ages 20 to 60 and to the colored population at all age periods.

The Medical Statistics of the Prudential Insurance Company of America.

If we now examine the data furnished by our Industrial experience I may preface my remarks by the statement that a very large portion of our risks are included in the population represented by the preceding four diagrams and that in some States, especially New Jersey, more than one-third of the entire population are insured under Industrial policies with our company, while some twenty-five per cent. more are insured with other Industrial companies. Hence the general problem of disease prevention affecting the total population is co-incident with the special problem affecting the interests of Industrial companies, and, as you will note, the data which follow are in entire harmony with the facts previously stated, even though it has been necessary to deal with deaths only.

It is impossible to furnish rates based on the exposure to risk, since the amount of clerical work required for such an investigation would be enormous, while the expense would be prohibitive. The method, however, which I have employed has proved quite satisfactory and useful for other office purposes, and hence the conclusions to be drawn from the data may be relied upon as approximately accurate for our purpose.

Industrial Mortality from Principal Causes.

In the first chart of this series I have made a comparison of the white adult mortality from principal causes, to indicate the all-important position which tubercular diseases assume in considerations affecting Industrial

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TABLE V.

Mortality from Ten Principal Causes—White Males and Females.

Industrial Experience, 1891-1899.

Tuberculosis	38,113
Respiratory Diseases	32,252
Nervous Diseases	21,480
Heart Diseases	17,351
Urinary Diseases	16,746
Digestive Diseases	15,292
Accidents	9,150
Cancer	8,453
Typhoid Fever	4,323
Suicide	1,727

mortality problems. You will note that of the mortality during the years 1891–1899 tubercular diseases caused over 38,000 deaths, a larger number than the mortality from any other group of diseases. Yet, as I have already pointed out, this statement is below the truth, since many deaths from chronic respiratory diseases, closely allied to tuberculosis, are not included in this number. But the great importance of tuberculosis as a disease affecting the interests of Industrial companies is set forth very clearly in this chart, deduced from a very large experience.

Industrial Mortality from Consumption by Sex and Age.

In the second chart I have shown the comparative percentage of deaths from consumption of the mortality from all causes at specified age periods with distinction of sex. You will note that at the most important ages, as high as forty out of every hundred deaths are due to consumption, illustrating in a forcible manner the vast financial aspect of the tuberculosis problem,

TABLE VI.

Mortality from Tuberculosis—White Males and Females.

Prudential Experience, 1891–1899.

Ages.	White Males.			White Females.		
	Deaths from all Causes.	Deaths from Tuberculosis.	Per cent. from Consumptive Tuberculosis.	Deaths from all Causes.	Deaths from Tuberculosis.	Per cent. from Consumptive Tuberculosis.
15–19	4,577	1,124	24·6	4,630	1,621	35·0
20–24	6,992	2,942	42·1	6,880	2,864	41·6
25–29	8,299	3,554	42·8	7,563	3,224	42·6
30–34	8,675	3,482	40·1	6,893	2,585	37·5
35–39	8,376	2,941	35·1	6,136	1,681	27·4
40–44	7,781	2,085	26·8	6,189	1,302	21·0
45–49	7,808	1,637	21·0	6,648	893	13·4
50–54	8,738	1,308	15·0	8,195	795	9·7
55–59	8,916	992	11·1	9,261	619	6·7
60–64	9,712	704	7·3	10,401	481	4·6
65–69	8,682	421	4·9	9,834	372	3·8
70–74	5,739	204	3·6	6,647	164	2·5
75–79	1,781	48	2·7	2,364	50	2·1
80–84	348	8	2·3	595	11	1·9

	White Males, aged 15-ω.		White Females, aged 15-ω.	
	Number.	Per cent.	Number.	Per cent.
Deaths from Consumption . . .	20,935	21·7	16,274	17·6
Deaths from Tuberculous Diseases .	516	0·5	388	0·4
Deaths from all other Causes . .	75,021	77·8	75,688	82·0
Total Mortality, 1891–1899 . .	96,472	100·0	92,350	100·0

since, irrespective of the relative intensity of the rate per thousand exposed, it is shown that at the ages of most importance for Industrial insurance purposes almost one-half of the entire mortality is due to this one specific and well-defined cause. I need not enter into other points of interest as to the differences between the mortality of the sexes, since the facts set forth are fully confirmed by facts previously presented for the population as a whole.

Industrial Mortality from Consumption by Race and Nativity.

In the third chart of this series I have brought together the information in our possession with reference to the disease liability of the coloured population to consumption. You will observe that at the younger ages, when least has been received in premiums and most is returned in claims, the proportion of deaths from consumption among the coloured risks far exceeds the mortality of the white element of our insured. As I have already stated, the negro

TABLE VII.

Mortality from Consumption by Race and Age Periods.

Industrial Experience, 1891–1899.

Ages at Death.	White Males and Females.			Ages at Death.	Coloured Males and Females.		
	All Causes.	Consumption.	Per cent. of Total at each Age.		All Causes.	Consumption.	Per cent. of Total at each Age.
1– 4	32,427	256	0·8	1– 4	1,065	44	4·1
5–14	22,449	686	3·1	5–14	1,034	206	19·9
15–24	23,179	8,320	35·9	15–24	1,355	589	43·5
25–44	59,912	20,417	34·1	25–44	2,607	796	30·5
45–64	69,679	7,236	10·4	45–64	3,251	278	8·6
65– ω	36,152	1.236	3·4	65– ω	1,046	33	3·2
Total .	243,798	38,151	15·6	Total .	10,358	1,946	18·8

race is subject to an excessive mortality from tubercular diseases, and in consequence the average death rate from all causes exceeds that of the white race by about 50 per cent. In the interest of our white policy-holders we made it a practice to impose an extra rate of about 50 per cent. upon risks accepted on negroes, but laws having been passed in different States compelling the companies to charge the same rate to both races, we have discontinued writing what we know to be an unprofitable class of risks for Industrial insurance purposes.

The important element of nationality in its relation to the disease liability to tuberculosis could not be dealt with in the first series of diagrams, since the calculation of rates would have required more time than could be spared for this purpose, but the omission is partly made good by the chart descriptive of our own experience during the two years 1898–1899. You will observe that at the age periods of most importance, that is fifteen to twenty-five, the

mortality of the English in the United States is less than the percentage of deaths from tubercular diseases for the other nationalities. This holds true until the age of forty-five, after which the Germans experience the most

TABLE VIII.

Mortality from Tuberculosis of White Males by Nativity and Age.

Industrial Experience, 1898-1899.

Americans.				English.			
Ages at Death.	All Causes.	Tuberculosis.	Tuberculosis.	Ages at Death.	All Causes.	Tuber-culosis.	Tuberculosis.
			Per cent.				Per cent.
15-24	2,776	889	32·0	15-24	48	10	20·8
25-34	3,410	1,518	44·5	25-34	79	29	36·7
35-44	2,550	908	35·6	35-44	152	32	21·1
45-54	1,746	345	19·8	45-54	175	33	18·9
55-64	1,614	200	12·4	55-64	220	21	9·5
65-74	1,550	75	4·8	65-74	244	8	3·3

Irish.				German.			
Ages at Death.	All Causes.	Tuberculosis.	Tuberculosis.	Ages at Death.	All Causes.	Tuber-culosis.	Tuberculosis.
			Per cent.				Per cent.
15-24	75	30	40·0	15-24	95	34	35·8
25-34	355	133	37·5	25-34	269	102	37·9
35-44	583	185	31·7	35-44	567	168	29·6
45-54	1,199	202	16·8	45-54	830	147	17·7
55-64	1,725	131	7·6	55-64	1,059	117	11·0
65-74	1,211	49	4·0	65-74	1,095	57	5·2

favourable mortality. I need hardly point out the fact, with which you are familiar, that the lower death rate from consumption among the English is fully balanced by an excessive mortality from chronic and acute respiratory diseases. Native Americans, you will notice, show the highest percentage at ages over twenty-five, but there are included in this term the children of foreign-born parents, among whom the Irish especially are most liable to the disease. The Irish, in our experience, show an excessive mortality at all ages under forty-five, and the same holds true for the Germans among our insured risks. These conclusions, I may add, are fully supported by the investigations of Dr. Billings, and reported in the Census volumes on Vital Statistics.

The general conclusion to be drawn from these facts is that race and nationality, next to age and sex, are most important elements affecting the liability of individuals to consumption and other tubercular diseases, and that a comprehensive investigation of the subject must be made to include the facts which I have just placed before you for your consideration.

Industrial Mortality from Tuberculosis by Occupation.

In the next two charts an attempt is made to place before you certain essential facts pertaining to the special liability to tubercular diseases of men employed in various more or less unhealthy and dangerous employments. You will note that stone-workers are subject to the disease to a most extraordinary degree, 43 per cent. of all the deaths being due to this cause. After stone-workers, we find the disease most common among printers, glass-workers, brass-workers, book-keepers and plumbers, in the order named. All of these occupations must be considered employments which those most liable to the disease should not engage in. There is no more promising field for investi-

TABLE IX.

Mortality from Tuberculosis in Specified Occupations.

Industrial Experience, 1897-1899.

Occupations.	Deaths from all Causes.	Deaths from Tuberculosis.	Per cent. of Deaths from Tuberculosis.
Stone Workers	202	87	43·1
Printers	327	129	39·4
Glass Workers	174	66	38·0
Brass Workers	101	38	37·6
Book-keepers	260	93	35·8
Plumbers	337	119	35·3
Salesmen	329	114	34·6
Hatters	209	72	34·5
Silk Workers	121	41	33·9
Cigar-makers	372	123	33·0
Potters	87	25	28·7
'Longshoremen	102	27	26·5
Moulders	300	77	25·7
Liquor Dealers	805	204	25·3
Grocers	314	76	24·2
Painters	815	191	23·4
Brewers	121	27	22·3
Bakers	280	62	22·1
Policemen	110	24	21·8
Weavers	173	37	21·4
Iron and Steel Workers	252	53	21·0
Masons	642	127	19·8
Butchers	456	88	19·3
Carpenters	1,360	255	18·8
Tailors	548	103	18·7
Blacksmiths	633	118	18·6
Merchants	244	42	17·2
Sailors	124	18	14·5
Brakemen	170	21	12·4
Miners	713	46	6·4

gation and reform than Industrial hygiene, and to none can the medical specialist direct his attention to better advantage and with the certain prospect of better results. (Note, for instance, the small percentage of deaths from consumption among miners, yet the rarity of this disease among men in mines has never been fully and intelligently investigated.) This point is

brought out in a still more forcible manner in the chart showing the tubercular mortality by selected occupations with distinction of age. You will observe

TABLE X.

MORTALITY FROM CONSUMPTION IN SELECT OCCUPATIONS WITH DISTINCTION OF AGE.

INDUSTRIAL EXPERIENCE, 1897–1899.

Ages.	Hatters.			Stone Workers.			Glass Workers.		
	Total Deaths.	Consumption.	Per cent. of Consumption.	Total Deaths.	Consumption.	Per cent. of Consumption.	Total Deaths.	Consumption.	Per cent. of Consumption.
15–24	24	8	33·3	6	2	33·3	30	12	40·0
25–34	51	29	56·9	31	20	64·5	46	27	58·7
35–44	53	24	45·3	47	24	52·1	36	14	38·7
45–54	22	5	21·7	59	26	44·1	22	9	40·9
55–64	31	4	12·9	37	10	27·0	18	2	11·1
	Cigar-makers.			Book-keepers.			Printers.		
15–24	27	12	44·4	42	20	47·6	70	37	52·9
25–34	98	48	49·0	80	45	56·3	98	54	55·1
35–44	76	33	43·4	42	11	26·2	69	26	37·7
45–54	65	11	16·9	36	5	13·9	32	3	9·4
55–64	62	8	12·9	33	5	15·2	28	3	10·7

COMPARATIVE PERCENTAGES.

Ages.	Hatters.	Stone Workers.	Glass Workers.	Cigar-makers.	Book-keepers.	Printers.
15–24	33·3	33·3	40·0	44·4	47·6	52·9
25–34	56·9	64·5	58·7	49·0	56·3	55·1
35–44	45·3	52·1	38·7	43·4	26·2	37·7
45–54	22·7	44·1	40·9	16·9	13·9	9·4
55–64	12·9	27·0	11·1	12·9	15·2	10·7

that at certain age periods the disease has caused more than one-half of the entire mortality—certainly a fact of utmost importance and significance to all who, by preventive measures, would attempt to eradicate tubercular diseases among the most useful of our Industrial workers. Stone-workers, you will note, retain their special disease liability to tuberculosis at all age periods, and the same is true of glass-workers, among whom at all ages a very large share of the mortality is due to this specific and well-defined cause, demanding on the part of the medical specialist a most careful and painstaking investigation as to the true cause responsible for this most unfortunate condition affecting the life and labour of our Industrial population.

It has been my privilege to make many thorough personal investigations into the subject of diseases of occupations, and on every opportunity I have

recommended that this branch of medical science be more thoroughly developed. It is never an industry as a whole which is responsible for an inordinate disease occurrence, especially from certain causes like tuberculosis, but always an industry in its parts. A few, sometimes but one minor branch of an industry will, on investigation, be shown to be the cause of the unhealthfulness of certain trades. It is the duty and the mission of specialists in Industrial hygiene to trace with accuracy the causes responsible for a condition at once so deplorable and indescribably sad, as, in the light of modern preventive medicine, it appears needless.

INDUSTRIAL MORTALITY FROM CONSUMPTION BY DURATION OF INSURANCE.

I have included in this series of charts two which bear indirectly upon the general subject, but which are of particular interest to life insurance companies as illustrations of the great financial problems implied in a possible and material reduction of the mortality from tubercular diseases. In the first of these charts I have compared the duration of insurance of policies terminating by death from consumption and of policies terminating by death from eight

TABLE XI.

MORTALITY FROM CONSUMPTION AND EIGHT OTHER CAUSES BY DURATION OF INSURANCE.

WHITE MALES AND FEMALES. INDUSTRIAL EXPERIENCE, 1891–1899.

WHITE MALES.

Duration of Insurance.	Deaths from Consumption.		Deaths from Eight other Causes.*	
Years.	No.	Per cent.	No.	Per cent.
1	4,486	18·8	6,667	18·4
2	3,964	16·7	4,881	13·4
3	2,885	12·1	3,778	10·7
4	2,238	9·4	3,567	9·8
5	2,010	8·4	3,092	8·5
6	1,604	6·7	2,572	7·1
7	1,365	5·7	2,238	6·2
8	1,163	4·9	1,959	5·4
9	902	3·8	1,563	4·3
10	786	3·3	1,402	3·9
11	620	2·6	1,129	3·1
12	498	2·1	978	2·7
13	405	1·7	721	2·0
14	294	1·2	594	1·6
15	207	0·9	377	1·0
16	148	0·6	268	0·7
17	93	0·4	165	0·5
18	75	0·3	123	0·3
19	42	0·2	74	0·2
20	15	0·1	44	0·1
21–∞	19	0·1	38	0·1
Total . .	23,819	100·0	36,330	100·0

* The eight other causes in White Males are: Alcoholism, Cancer, Paralysis, Insanity, Valvular Disease of Heart, Pneumonia, Cirrhosis of Liver, Bright's Disease.

TABLE XI.—*continued.*

WHITE FEMALES.

Duration of Insurance.	Deaths from Consumption.		Deaths from Eight other Causes.*	
Years.	No.	Per cent.	No.	Per cent.
1	3,495	18·7	6,564	16·3
2	3,094	16·5	5,168	12·8
3	2,313	12·4	4,358	10·8
4	1,860	9·9	3,929	9·7
5	1,547	8·3	3,455	8·6
6	1,281	6·8	2,977	7·4
7	1,041	5·6	2,451	6·1
8	797	4·3	2,137	5·3
9	741	4·0	1,856	4·6
10	607	3·2	1,609	4·0
11	497	2·6	1,442	3·6
12	399	2·1	1,125	2·8
13	336	1·8	909	2·3
14	270	1·4	707	1·8
15	156	0·8	515	1·3
16	93	0·5	396	1·0
17	78	0·4	261	0·6
18	53	0·3	178	0·4
19	33	0·2	105	0·3
20	18	0·1	80	0·2
21–∞	17	0·1	50	0·1
Total . .	18,726	100·0	40,272	100·0

* The eight other causes in White Females are: Cancer, Paralysis, Insanity, Valvular Disease of Heart, Pneumonia, Cirrhosis of Liver, Bright's Disease, Diseases of Parturition.

other principal causes. Of course, as you know, the greatest losses in life insurance are due to the mortality of insured during the early years of policy duration, when very little has actually been paid in premiums to the company. Hence the fact is of importance that of those who died from consumption a much larger number died during the early periods of insurance duration than was the case with the other and equally important diseases. Of the deaths at all durations the percentage of those who died during the first four years of insurance was much higher for those who died from consumption than for those who died from other causes, and hence the financial loss sustained by the company was much greater for this disease than for others.

In another way a somewhat similar result is shown for the mortality from consumption when we compare the percentage of deaths at different durations according to whether the applicant had been medically examined at the time the insurance was applied for. In Industrial insurance for amounts over $150.00 we require a medical examination, and hence we are able to show to what extent this method of protection against the insurance of impaired risks has been useful to the company. On examination of the chart it appears that the percentage of deaths during the early years of insurance was much greater for those who had not been examined than for those who had been passed by a medical examiner, and hence the conclusion that, as far as

TABLE XII.

Mortality from Consumption of White Males and Females by Duration of Insurance. Examined and not Examined Risks.

Industrial Experience, 1891–1899.

WHITE MALES.

Duration of Insurance.	Medically Examined Risks.		Not Medically Examined Risks.	
	Deaths from Consumption.	Per cent. at Different Durations.	Deaths from Consumption.	Per cent. at Different Durations.
Years.				
1	941	11·2	3,545	23·0
2	1,084	12·9	2,880	18·7
3	926	11·0	1,959	12·7
4	797	9·4	1,441	9·4
5	738	8·8	1,272	8·3
6	663	7·9	941	6·1
7	651	7·7	714	4·6
8	527	6·2	636	4·1
9	450	5·3	452	2·9
10	387	4·6	399	2·6
11	299	3·6	321	2·1
12	265	3·1	233	1·5
13	211	2·5	194	1·3
14	151	1·8	143	0·9
15	104	1·2	103	0·7
16	86	1·0	62	0·4
17	54	0·6	39	0·3
18	51	0·6	24	0·2
19	26	0·3	16	0·1
20	7	0·1	8	0·1
21–ω	13	0·2	6	0·0
Total . .	8,431	100·0	15,388	100·0

WHITE FEMALES.

1	806	11·8	2,689	22·7
2	941	13·7	2,153	18·1
3	817	11·9	1,496	12·6
4	696	10·1	1,164	9·8
5	641	9·3	906	7·6
6	548	8·0	733	6·2
7	466	6·8	575	4·8
8	377	5·5	420	3·5
9	362	5·3	379	3·2
10	292	4·3	315	2·7
11	254	3·7	243	2·1
12	191	2·8	208	1·8
13	148	2·2	188	1·6
14	119	1·7	151	1·3
15	61	0·9	95	0·8
16	50	0·7	43	0·4
17	37	0 5	41	0·3
18	23	0·3	30	0·2
19	18	0·3	15	0·1
20	8	0·1	10	0·1
21–ω	9	0·1	8	0·1
Total . .	6,864	100·0	11,862	100·0

the data will allow, the medical examination has unquestionably excluded a considerable number of risks which would have proved a great loss to the company during the first few years of policy duration.

Thus, of the males who had been examined and who died from consumption, 11 per cent. died during the first year of insurance, against 23 per cent. for those who had not been medically reported upon. Satisfactory as this contrast of the two classes of risks must be to the company, it is also clear that the proportion of deaths during the earlier period of insurance duration, even among medically examined risks, is very considerable. I cannot but think, and I shall presently consider certain facts bearing upon this point, that in a large number of cases, if not in a majority, the medical examination of Industrial insurance fails to eliminate the risks most likely to die within a few years from tubercular diseases, and that one of the problems of the future, closely allied to the general problem of disease prevention, is the more perfect development of a reasonably accurate method of early diagnosis. The truly enormous financial interest of Industrial companies is set forth in the following chart, which bears directly on the point of greatest importance, namely, to what extent Industrial insurance companies are financially interested in the problem, the successful solution of which it is hoped this Congress will do much to bring about.

The Financial Importance of the Problem.

In a few words, the annual cost of deaths from tubercular diseases to the Prudential Insurance Company of America is approximately, on the basis

TABLE XIII.

Financial Statistics of the Mortality from Consumption.

Industrial Experience, 1895-1897.

Ages.	Cases.	Income.		Outgo.		Ratio of Income to Outgo.
		Amount.	Amount per Case.	Amount.	Amount per Case.	
		$	$	$	$	$
15-19	1,181	13,304	11·3	143,321	121·4	10·8
20-24	2,514	35,131	14·0	337,356	134·2	9·6
25-29	2,918	52,565	18·0	442,294	151·6	8·4
30-34	2,626	52,580	20·0	384,565	146·4	7·3
35-39	2,080	56,438	27·1	314,964	151·4	5·6
40-44	1,534	39,982	26·1	211,837	138·1	5·3
45-49	1,144	33,572	29·3	141,937	124·1	4·2
50-54	994	36,030	36·2	124,169	124·9	3·4
55-59	784	31,954	40·8	83,484	106·5	2·6
60-64	578	23,802	41·2	52,023	88·3	2·2
65-69	365	18,243	50·0	29,621	81·2	1·6
70-74	204	13,248	64·9	16,340	80·1	1·2
75-79	53	4,738	89·4	3,701	69·8	0·8
80-84	8	..	..	..	..	..
85-89	1	..	..	..	..	..
Total .	16,984	$411,587	$24·2	$2,285,612	$134·6	$5·6

of three years' experience, the sum of $800,000. Over 6,000 deaths are annually due to this cause in our experience at the present time, and as far as I am able to judge from the facts before me, the company has thus far benefited little by the actual decline in the death rate from consumption which we know has taken place in recent years. I attribute this rather unexpected result to the fact that there is a very strong selection against the company, which it has thus far been impossible to overcome by our present method of medical examination, by too much reliance upon the doubtful value of the family history of the applicant, and by too little reliance upon the determining method of a thorough physical diagnosis. Hence you note, and no doubt with surprise, that while on the average we have received $24.00 from those who died from consumption, we returned to the beneficiary under Industrial policies over $134.00, a net loss of about $110.00 on every case, or more than half a million dollars during the course of a year. Of course there is a great difference as to the losses sustained at different age periods, and naturally the income is least at the younger ages. As age increases, the average duration of insurance increases, and the amounts paid in premiums to the companies tend more to approach the amounts paid out in claims, but the fact remains that, taking the business as a whole, we lose about $110.00 on every death from consumption which occurs in our experience at the present time. If you examine these facts closely you will realise the great interest of the Industrial companies in the problem of diminishing the mortality from tuberculosis, especially at the early ages, when, as for instance at 25–29, we will have received $18.00 in premiums to every $150.00 paid out for losses. Thus I believe I have not gone too far in the earlier part of my remarks when I have stated that the interests of Industrial companies in the prevention of tuberculosis are co-incident with the general interest of the population at large, since in certain portions of the United States four-fifths of the entire population are to-day insured on the Industrial plan of family insurance.

Risks Declined for Family History of Consumption.

Before I touch upon the general question of how Industrial companies can be made to assist in the measures or methods to be proposed by this Congress for the gradual extermination of tuberculosis as a disease of modern life, I wish to call your attention to a few graphic illustrations of a series of related facts upon which, in my opinion, the companies must rely very largely for practical results. I have five charts illustrative of the points to which I direct your attention, the first three of which have reference to our rejection experience, while the last two present the results of a special investigation as to the physical condition of applicants at the time of entry, and the subsequent termination of the policy by death from tubercular and non-tubercular diseases.

As to the after-experience with rejected risks, I believe that the data furnished by the Prudential are unique, in that I am not aware of any other company having attempted to secure similar results. It is a rule with our company that applicants who present themselves for examination must

present the first policy for endorsement before a second application will be considered. Now our Medical Director, Dr. Edward Hamill, conceived the plan to mark all such policies for future identification by means of a small number written under the seal of the policy in cases where the second application was rejected, and after a card containing the information had been written and filed the same would be completed when in the course of years the original policy terminated by death. This method was followed for eleven years, and we have now accurate information for some forty thousand rejections with the mortality for twelve years, that is to January, 1900.

Before considering this class of facts derived from our own experience, I must briefly discuss the general rejection data with reference to tubercular

TABLE XIV.

REJECTIONS FOR RESPIRATORY AND TUBERCULAR DISEASES AND FAMILY HISTORY.

ORDINARY AND INDUSTRIAL EXPERIENCE.

Causes of Rejections.	Ordinary Experience, 1899.		Industrial Experience, 1888–1898.	
	Number.	Per cent.	Number.	Per cent.
Rejected for Respiratory Diseases	1,153	12·5	7,528	18·8
,, ,, Tubercular ,,	96	1·0	2,162	5·4
,, ,, Family History . .	423	5·1	1,348	3·4
,, ,, all other Causes .	7,565	81·4	29,097	72·4
Total Rejections . . .	9,237	100·0	40,135	100·0

diseases, respiratory diseases, and family history. As you will note, the chart shows two circles divided by black lines, indicating the proportion of risks rejected for each of the causes named. You will note that our rejections in both our Ordinary and Industrial branches were largest for respiratory diseases, but in the Ordinary we rejected a much larger proportion for family history than in the Industrial, while our rejections for tubercular diseases were proportionately larger in the Industrial than in the Ordinary. The meaning of this chart is that in Ordinary insurance the applicants who present themselves for examination are less likely to be impaired risks, because of a tubercular condition, while more attention is given to the question of heredity and family record. I cannot but think that even in our Ordinary risks we receive a large number who are already in the earliest stage of the disease, largely because our present method of physical diagnosis is imperfect and too much attention is given to inquiry into family records, which are at best of doubtful value. I do not wish it to be understood that I would ignore this aspect of the question entirely, but I certainly am of opinion that in the large majority of cases where the answer is that neither parent nor relative has died of consumption, the reply is wilfully or intentionally

e consider the large amount of tuberculosis affecting the I ..., it is inconceivable that so small a proportion of appli- ...isurance should have what has been called a tainted family Hence I believe that less attention should be given to a family ...of consumption and more attention to the physical condition of the nt, and other things equal, few, if any, should be rejected for the sole that a death from consumption has occurred in the family.

chart having reference to our experience with rejected risks will fully ...t this point of view. In the termination of rejected risks (males) for

TABLE XV.

TERMINATION OF RISKS REJECTED FOR CONSUMPTION AND FAMILY HISTORY.

INDUSTRIAL EXPERIENCE, 1888-1900.

MALES.

Mode of Termination.	Rejected for all Causes.		Rejected for Consumption.		Rejected for Family History.	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
Terminated by Death by Jan. 1st, 1900	3,763	22·8	349	36·4	45	9·1
Terminated by Lapse by Jan. 1st, 1900	4,876	29·5	254	26·5	186	37·5
In Force on Jan. 1st, 1900 . .	7,893	47·7	355	37·1	265	53·4
Total Rejections . . .	16,532	100·0	958	100·0	496	100·0

FEMALE.

Mode of Termination.	Rejected for all Causes.		Rejected for Consumption.		Rejected for Family History.	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
Terminated by Death by Jan. 1st, 1900	4,912	20·8	365	30·3	77	9·5
Terminated by Lapse by Jan. 1st, 1900	5,886	24·9	294	24·4	258	31·9
In Force on Jan. 1st, 1900 . .	12,805	54·3	545	45·3	475	58·6
Total Rejections	23,603	100·0	1,204	100·0	810	100·0

all causes, it appears that 23 per cent. have died during the period under observation, while of those rejected for consumption 36 per cent. have died, and of those rejected for family history, that is, on the ground of a supposed hereditary predisposition, only 9 per cent. have terminated by death. Thus you note how small is the proportion of deaths among a class of applicants rejected almost entirely on theory, and how large the proportion of deaths among those rejected on the ground of fact. Hence the conclusion that, if otherwise in physical good health, an applicant with a family record of consumption may be safely accepted for life insurance purposes,

Yet our experience proves that a family record of consumption cannot be entirely ignored, for, as you will observe in the chart descriptive of the mortality of rejected risks, of those who died among the risks rejected for family history, a very large proportion died from consumption. This apparent contradiction I explain on the ground that this class of applicants were otherwise poor risks, representing infected types in the early stages of the disease, which would also have been declined on the ground of other evidences of impairment. This point, I do not think, has ever been seriously considered by the medical directors of life insurance companies, but the same has been fully discussed by medical writers, especially by Dr. Greene, the author of the most recent treatise on medical examination in life insurance :—

"EXPOSURE TO INFECTION.—Curiously enough, despite the well-known infectivity of tuberculosis, insurance companies have, until quite recently,

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TABLE XVI.

MORTALITY OF REJECTED RISKS FROM TUBERCULOSIS.
INDUSTRIAL EXPERIENCE, 1888–1900.

REJECTED FOR ALL CAUSES.

	Males.		Females.	
	No.	Per cent.	No.	Per cent.
Mortality from Tubercular Diseases . . .	827	22·0	798	16·2
,, ,, all other Causes	2,936	78·0	4,114	83·8
Total	3,763	100·0	4,912	100·0

REJECTED FOR CONSUMPTION.

	Males.		Females.	
	No.	Per cent.	No.	Per cent.
Mortality from Tubercular Diseases . . .	216	61·9	215	58·9
,, ,, all other Causes	133	38·1	150	41·1
Total	349	100·0	365	100·0

REJECTED FOR FAMILY HISTORY.

	Males.		Females.	
	No.	Per cent.	No.	Per cent.
Mortality from Tubercular Diseases . . .	26	57·8	47	61·0
,, ,, all other Causes	19	42·2	30	39·0
Total	45	100·0	77	100·0

quire as to the applicant's association with consumptives. As a this omission companies have insured thousands of men ily in their own households to infection through their wives or

t this extract from Dr. Greene's work explains the reason why nd a mortality from tubercular diseases among those who had rejected for family history, and that if inquiry had been made it would been shown that infection and not heredity would explain the excessive tality from tuberculosis.

Of those rejected for consumption, we find that a very large proportion died from this cause, proving the accuracy of diagnosis and the value of medical inquiry and examination. Our records do not show how long the rejected applicant had suffered from the disease, or in what stage of the same he was declined, but it is more than probable that a very large proportion of the risks rejected for consumption are of persons in the first or incipient stage. I shall presently have something to say as to this class of unfortunates, who come before life insurance companies at a time when the right kind of advice and the right kind of treatment would, in a large majority of instances, save human life for many years and increase materially the sum of human happiness. For us it is enough to know that the interests of Industrial insurance companies demand a most careful inquiry into the facts of physical diagnosis, so that risks which are now rejected for family history on the unwarranted assumption of a supposed hereditary character of the disease should be accepted by the companies, to mutual advantage, while risks now accepted under an imperfect system of physical examination, and terminating by death from tuberculosis during the early period of policy duration, should have been rejected, to the great advantage of the companies and their policy-holders.

Physical Condition in its Relation to Disease.

Progress in the direction of more accurate diagnosis lies in the recognition of physical facts as to the normal proportion and condition of the human body. Consumption, as the name implies, is a wasting disease, and among the first and most important, if not all-important, signs of the disease in its incipient stage, is the loss of weight, or the lack of proportion between the stature and bulk of the body. I have briefly touched upon the essential elements of this branch of my inquiry in two charts, to which I now direct your attention. The first of these charts illustrates our Ordinary experience, for which the physical data are somewhat more accurate and available in more detail; the second chart pertains to our Industrial experience with risks for amounts of $50·00 and more. In both cases the data or physical measurements were obtained by a qualified medical examiner, and they may be accepted as accurate for all practical purposes to which these conclusions are applicable. First in the order of importance we must consider the absolute weight of those who died from tubercular and from non-tubercular diseases. It will be observed in both investigations, based on a large enough number of cases, that the weight of those who died from consumption was

invariably less than the weight of those who died from other causes. The same holds true for the average degree of inspiration and expiration between non-consumptives and consumptives. It will be observed that according to our Ordinary experience the difference in inspiration or expiration between non-consumptives and consumptives was fully one inch. But the more determining facts are brought out by an examination of the average weight relative to stature. This point has been very clearly expressed by Loomis, as quoted by Knopf, that "Weight, respiratory capacity and chest measurement have no value in establishing the possibilities of the development of phthisis in themselves, but must be considered in relation to the height [and age, I should add] of the person, when they furnish important aids to the diagnosis."

Light Weight and Predisposition to Consumption.

Let us examine the facts set forth by these charts with special reference to these points. I have, for the sake of convenience, arranged the mortality by

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TABLE XVII.

Physical Condition in its Relation to Disease.

Ordinary Experience—Males—1886–1899.

Causes of Death.	Total Deaths.	Above Standard Height.		Below Standard Height.	
		Number.	Per cent.	Number.	Per cent.
Tubercular Diseases . . .	314	84	26·8	230	73·2
Respiratory ,, . . .	244	109	44·7	135	55·3
Nervous ,, . . .	149	84	56·4	65	43·6
Digestive ,, . . .	138	79	57·2	59	42·8
Heart ,, . . .	85	52	61·2	33	38·8
Urinary ,, . . .	86	55	63·9	31	36·1

	Tubercular Deaths.	Non-Tubercular Deaths.
Average Inspiration	36·7 inches	37·9 inches
Average Expiration	33·3 inches	34·4 inches
Average Chest Expansion . .	3·4 inches	3·5 inches
Average Weight	147·5 pounds	157·3 pounds

Stature in its Relation to Weight.

Tubercular Deaths.

	Deaths.	Deaths below Standard Weight.	Per cent. Deaths below Standard.
Under 5 feet 6 inches	31	14	45·2
5 feet 6 inches to 5 feet 10 inches . .	238	181	76·1
5 feet 11 inches and over	45	35	77·8

Stature in its Relation to Chest Expansion.

Tubercular Deaths.

	Total Deaths.	Deaths below Standard.	Per cent. Deaths below Standard.
Under 5 feet 6 inches	31	10	32·3
5 feet 6 inches to 5 feet 10 inches .	238	172	72·3
5 feet 11 inches and over . .	45	39	86·7

TABLE XVIII.

ICAL CONDITION IN ITS RELATION TO DISEASE.

INDUSTRIAL EXPERIENCE, 1888–1893.

	RTALITY FROM TUBERCULAR DISEASES (MALES).			MORTALITY FROM NON-TUBERCULAR DISEASES (MALES).		
	Deaths.	Below Standard Weight.	Per cent. Below.	Deaths.	Below Standard Weight.	Per cent. Below.
	1	..	..	..	..	..
	..	..	..	..	..	..
	3	1	33·3	8	2	25·0
	5	..	..	5	1	20·0
	5	2	40·0	21	3	14·2
	8	2	25·0	27	8	29·6
	24	10	41·6	88	30	34·1
	45	27	60·0	163	64	33·1
	86	44	51·2	224	107	47·8
	88	56	63·6	252	109	43·3
68	109	69	63·3	313	135	43·1
69	72	52	72·2	231	98	42·4
70	57	46	80·7	157	75	47·8
71	32	23	71·9	112	51	45·5
72	17	11	64·7	53	23	43·2
73	4	4	100·0	14	5	35·7
	5	5	100·0	9	5	55·5
	2	2	100·0	4	3	75·0
. . .	563	354	62·9	1,681	719	428
Under 66	91	42	46·2	312	108	34·6
66–70	412	267	64·8	1,177	524	44·5
71–ω	60	45	75·0	192	87	45·3

Male and Female Mortality from Tubercular Diseases	781
Cases with Consumption in Family History	32
Per cent.	4·1
Male and Female Mortality from Non-Tubercular Diseases . . .	2,525
Cases with Consumption in Family History	83
Per cent.	3·3

AVERAGE WEIGHT.

Stature.	MALES.		FEMALES.	
	Tub. Diseases.	Non-Tubercular.	Tub. Diseases.	Non-Tubercular.
	lbs.	lbs.	lbs.	lbs.
Under 66 in. . .	139	143	123	137
66–70 in. . . .	149	157	136	150
71 and over . . .	163	176	..	..

groups of stature, short, medium, and tall, and in each case I have divided the deaths as to whether they were below or above the Prudential standard of weight. Calculating the percentage of those above and below the average

standard, we find that in both the Ordinary and the Industrial risks, dying from tubercular diseases, the proportion below average standard was very largely in excess of the percentages for deaths from non-tubercular diseases. Thus you will note that of the Ordinary risks terminating by death from tubercular diseases 73 per cent. were below standard weight, but, as you will observe, this tendency to light weight increases with increasing stature, so that the percentage below standard is largest for those who were of stature 71 inches and higher. This, then, is a most important fact to be taken into consideration—namely, that of those most liable to tubercular diseases, the most pronounced characteristic will be light weight in proportion to height, but that this will be especially true for tall persons of 71 inches in height and over. Various investigations into this subject have all confirmed this conclusion, than which to my mind there is none of greater determining importance in the physical diagnosis for life insurance purposes and as a most certain means of determining the class of risks most likely to prove susceptible to tubercular diseases.

This point, I need hardly say, has been fully recognised by most of the modern writers on consumption and the medical aspects of life insurance, but thus far no company has published as fully and in detail as would be desirable its experience. Greene, who, as I have said, has written ably and intelligently on the question of examination for life insurance, makes mention of three early signs of the disease, the first of which he refers to as "progressive loss of weight," and to this he adds "temperature" and "rapid pulse."

Temperature as an Aid to Diagnosis.

I regret that I am not able to give facts from our own experience with reference to these two indeed most important aids to early diagnosis of incipient phthisis, but as to temperature I cannot do better than quote from the extremely valuable work by Seguin, who wrote as follows with special reference to life insurance examinations: "During tubercularisation all the signs expected from the keenest recourse to physical diagnosis may be silent, whereas thermometry will give out positive evidences of the consumptive process"; and further, that "the temperature is a more accurate indication of the amount of tuberculosis and tubercularisation than either the physical signs or symptoms. By means of the thermometer we can diagnose tuberculosis long before the physical signs or symptoms are sufficient to justify such diagnosis." This view is accepted by Greene, who writes: "A slight daily rise in temperature is now universally recognised as a symptom of great importance. The rise usually occurs late in the afternoon, but it is occasionally reversed. Why life insurance companies have not more generally recognised the importance of this symptom is a difficult matter to understand." It is a pleasure to me to be able to say that our company requires a statement of the body temperature, and frequent inquiry of our examiners has convinced me that the value of the thermometer in life insurance is generally recognised by those who have taken most pains to protect the interests of the company.

The Pulse Rate as an Aid to Early Diagnosis.

The pulse rate is another means of early diagnosis which, to my knowledge, has been but imperfectly developed in life insurance examinations. As Greene has pointed out, "a rapid pulse is a very constant feature in incipient tuberculosis, and should suggest the propriety of determining the temperature of the applicant," but a still more important fact is, that to determine the pulse rate, note must be made whether applicant was sitting or standing, and the observation must be at least the mean of three, taken for half a minute each. My investigations into this branch of my inquiry have confirmed the view of Professor Gould, that most statements as to the rate of the pulse are unreliable and useless, giving strong evidence of guesswork multiplied by four.

I cannot very well enter into the question of physical examination proper, since I have not been able to obtain the necessary information for an intelligent report, but a careful statement of the entire subject will be found in a paper on "Early Recognition of Pulmonary Tuberculosis," by S. A. Knopf, M.D., who also makes mention of the method employed by Dr. Stubbert, at the Loomis Sanitarium, where the Roentgen Rays are used to apparently good advantage. Dr. Stubbert has fully reported upon some seventy cases, and I cannot but think that in doubtful cases this method is likely to be of great value.

Importance of Early Diagnosis in Phthisis.

Thus the conclusion would seem fully warranted that by a careful physical diagnosis it is not difficult to determine with a reasonable degree of accuracy the fact of phthisis in its incipient stage, and hence the need on the part of life insurance companies to more carefully and scientifically develop this branch of the examiner's work. That insufficient attention is at present given to the great importance of light weight as a factor making for an increased liability to tubercular diseases is made evident by the fact that the mortality of life insurance companies from this disease is excessive during the early years of policy duration. When you consider that the light weight cases indicated by the charts represent light weights at entry, you will realise the possibility of a more perfect diagnosis in the future, and the opportunity for better selection by a recognition of the value of accurate anthropometry as an aid to the life insurance examiner. A large amount of work remains to be done before it will be possible to develop this idea to the highest degree of usefulness, since a proper average standard of height and weight, according to age, sex, chest expansion, etc., has yet to be deduced from the vast experience of the companies and related data furnished by the Army, Navy, and the colleges and associations collecting data of this kind, but I feel confident that in time the most useful aid to those who would stamp out this disease by preventive measures will come from this source of largely neglected facts.

It has been difficult to condense my remarks more than I have been able to without sacrifice of clearness, and yet I fear that I have fallen short of

complete justice to a body of facts of human experience, such as no records or efforts of the State can ever supply. In State registration of Vital Statistics you obtain a very limited amount of information, but in life insurance practice you have before you practically the whole vital and physical history of the decadent from birth to grave. I am fully conscious that thus far life insurance companies have not contributed their medical experience as largely and in detail as would be desirable, but it must not be ignored that the business, especially of Industrial insurance, has only of late reached a stage where the experience of the past can be considered a safe guide for the future and useful for the purposes of disease prevention, sanitary improvement, and the general advancement of the industrial population.

Should Industrial Insurance Companies Contribute to the Erection and Maintenance of Sanatoria?

I have taken the liberty to construe this question in a liberal manner, and I have made it to include other means and methods by which Industrial companies can be made to assist in the prevention and treatment of tubercular diseases. Having shown that the financial interest of our company in this problem amounts to four-fifths of a million dollars per annum, I need hardly say that this proposition has received our most careful consideration, but the more thoroughly the subject is examined, the more clear has become the conviction that it would be a most unfortunate error on the part of Industrial companies to undertake the treatment of diseased policy-holders, even though this action could be justified on the highest ground of humanity and philanthropy. Once the companies were to engage in this form of direct assistance to afflicted policy-holders, they would soon be confronted with numerous propositions to make equal provision and grant equal consideration to policy-holders suffering from other diseases, or even from the results of accidents where, let us say, a surgical operation involving considerable expense would perhaps be the means of saving the life of the insured. The company represents the interests of *all* the policy-holders, and not of any special class, however unfortunate or afflicted, and while I shall discuss the proposition at some length, I do not regret to say, that to my way of thinking and in the light of the facts which I have collected, it would be both financially impossible, as it would be otherwise inexpedient, on the part of Industrial companies to "contribute to the erection and maintenance of sanatoria."

Sanatoria Treatment by German Insurance Societies.

The German experiment of sanatoria treatment of policy-holders suffering from tubercular or other diseases is confined to the insurance societies which are branches of the Government insurance system. Many references to this experiment occur in the literature of the sanatoria propaganda, but the data upon which the conclusions are founded appear to me very fragmentary and inconclusive. Thus far the private insurance companies in Germany have not, to my knowledge, followed the societies under Government control or supervision, and I do not see how, in the light of experience, they are ever

likely to do so. The emphatic approval of the plan is based rather on the humane side of the question, considered from which the results obtained from sanatoria have fully justified the undertaking; but that is rather an endorsement of the sanatoria idea as such than of the life insurance aspect of the question. To life insurance companies the proposition resolves itself into this, that the companies have no funds at their disposal for charitable purposes, and that, therefore, if the idea is at all practicable, it must be on the ground that the interests of *all* the policy-holders will be advanced by whatever methods are adopted to improve the health or prevent the mortality of those who now fall victims to tubercular diseases.

Sanatoria Treatment impossible by Industrial Insurance Companies.

The Industrial companies insure millions of policy-holders for small sums, on the average about $150.00 for adult policies. As I have shown, on the deaths from this cause the Prudential received but $20.00 in premiums to every $130.00 paid out in losses. This sum of $24.00 represents the equity of the policy-holder, but only a portion of this represents the reserve or possible cash surrender value, and hence the amounts actually paid by Industrial policy-holders do not possess the necessary intrinsic value to provide for sanatoria treatment at even the most reasonable institution and for the most reasonable period.

The Cost and Duration of Sanatoria Treatment.

Let us examine briefly into the facts of sanatoria treatment in the United States. I have corresponded with most of the well-known institutions for this purpose, and find that under the most reasonable conditions the cost per week per patient will be $5.00, while the average duration of treatment must be at least 13 weeks. The lowest amount which would, therefore, provide for sanatoria treatment is $65.00, but if all other expenses are added and more liberal treatment is given for a period of five to six months, even in institutions partly supported by private charity, or by the State, the cost per patient of the industrial population will average from $100.00 to $120.00. Against this we have it that the average Industrial policy-holder will have paid but $24.00 to the company, and hence from a financial as well as from a general point of view the Industrial companies are not in a position to assist in the erection and maintenance of sanatoria for consumptives.

Effects and Value of Sanatoria Treatment to Industrial Companies.

The error which underlies most of the reasoning on this subject by the advocates of insurance assistance is that the amounts of insurance to be paid at death are assumed to have been saved to the company if death from tuberculosis has been avoided by proper treatment. Manifestly, it requires but a moment's thought to make it clear that the financial interest of the companies is limited to the increased duration of policy-life, or the increased

premium income in consequence of prolonged existence. I have tried to obtain data on this point, but the fragmentary character of the German experiments has not made it clear to me that the increased longevity is, on the average, very considerable from an insurance point of view. Let us assume it to be five years, which I am told is perhaps too high. The company receives five more years of premiums at, say, $7.80 per annum, about $40.00 in all, or not half enough to meet the average expenses incurred by proper treatment at a sanatorium. The policy-holder must die from some cause, and the amount of the policy must be paid some time, hence if increased duration of life is not sufficient to provide, by increased premiums, the cost of treatment, the companies cannot engage in this undertaking.

Industrial Insurance Companies and Preventive Medicine.

It has been shown, I trust with sufficient clearness, that it does not fall within the range of even remote possibility that Industrial insurance companies are likely to become directly interested in the sanatoria treatment of policy-holders suffering from tubercular diseases, but there would seem to be a far more promising field of usefulness by which these companies can substantially aid those who are interested in the prevention of this disease. As you probably know, one of the fundamental principles of our business is the collection of the weekly premium from the houses of the insured. Our agents, whose number is now about ten thousand, visit weekly the homes of some four million policy-holders, and it is through our own men, interested alike in the policy-holder and the company, that I would like to see an attempt made to interest the industrial population by the distribution of literature and by direct intelligent advice, in the solution of the problem which confronts us. I do not recall that this point has ever been seriously advocated except in a communication in the *Spectator*, a leading insurance publication of New York, where in an article on the subject Mr. William Barnes presents the matter as follows :—

> "I desire to present for consideration of students of insurance of life, methods of education of the insured whereby the best system of living may be secured which will result in the maximum of resistance against the influences which are ever present in the environments of human beings which are at war with health and produce death. This I believe could be accomplished through suggestive sanitary and hygienic literature, presented in such an attractive form and simplicity of style as to insure notice and command regard. But such a system of education should be carefully guarded, so as not to be made arbitrary or offensive, and thus fail of its purpose; therefore the detail of such work should receive the most profound study and diplomatic exploitation. The main purpose, of course, of such educational system would be to show the insured how to preserve health and promote longevity, thus increasing not only their ability to earn income, but to make the payment of premiums an easy distribution of their surplus earnings."

Popular Literature on the Preventive Treatment and Cure of Tuberculosis.

I believe that this suggestion is well worth considering. The proposition is practically identical with the general practice of State and municipal authorities, but we would have far better means and opportunities of reaching the people most in need of intelligent information as to the prevention, treatment, and cure of tubercular diseases than are ever likely to aid the sanitary authorities. Our agents are on the best of terms with their clients, and the most friendly relations exist between the weekly collector and the insured. From the very early stages the agent will usually have the information or suggestion as to the probable development of the disease, and it would seem to me indeed a not at all difficult task to so arrange the required literature that a few leaflets dealing with the most important aspects of the problem, prepared by the most qualified authorities, should be placed in the hands of those most in need of education and advice at a time when practically everything depends on whether or not the right course is adopted.

The leaflets should be of convenient size, so as to be carried in the pocket; they should be free from all technicalities, they should be limited to the bare recital of the most essential facts, they should not attempt to treat of the subject in all its important aspects; but, as I have said, they should be limited to the most important essentials. I have not yet found the ideal discussion of the subject for general distribution. Perhaps it is most difficult, but I believe a way out will be found, and in the main the ideas of Dr. Knopf, of New York; of Dr. Young, of the Maine State Board of Health; and of Dr. Russell, of Glasgow, should be adopted. From the work of Dr. Knopf I quote as follows, with particular reference to this point:—

> "The circulars issued by the Board of Health in regard to any diseases, but especially in regard to consumption, should be framed in clear, precise, untechnical, and comprehensible language. They should call attention to the danger from an unclean, unscrupulous consumptive, and explain wherein this danger lies and how to avoid it. But the circular should explain also that if proper precautions are taken, there is no danger in associating with such a patient. Not to frighten very impressionable natures, the circular should state that pulmonary tuberculosis is one of the most curable and frequently cured diseases, for this has been amply proved; and the earlier the patient puts himself under the doctor's care, the more chance has he for an early and complete recovery. Such circulars should be freely distributed, and especially in the densely crowded districts of large cities."

Essentials of Prevention, Treatment, and Cure.

In framing our "policy of advice" we would be largely guided by our past experience. The direction of greatest usefulness is pointed out by the data for the male population, showing that at ages 20 to 60 the mortality from consumption is almost the same to-day as thirty years ago; the data for race

and nationality supplement this information, while the information for unhealthy occupations is a particularly trustworthy and valuable guide. It is only too true, in the words of Dr. Bryce, the Executive Health Officer of Ontario, that "Consumption is one of the products of man's ignorance," and the hope of the future lies in the direction of education, for which the Industrial insurance companies have an immense opportunity and, I need hardly add, the necessary means.

Consumption not an Hereditary Disease.

First in order of importance, it seems to me, is the duty to dispel the error that consumption is an hereditary disease. I am afraid life insurance companies have been largely responsible for the spread of this idea among the general public, by the invariable inquiry as to family history and the usual rejection where a truthful reply is made. I would not omit this question from the medical report, but I would so frame it that all suggestion of special reference to a tubercular family history would disappear. I would add, however, the inquiry suggested by Dr. Greene, so that the reply would be clear and specific as to whether applicant was now "exposed" to the danger of infection by living or coming in frequent contact with a person suffering from a tubercular disease. This would place before the applicant the importance of personal protection and the need of personal hygiene as a measure of prevention.

Predisposition not Proven by a Family History of Consumption.

The second point to which I would make efforts to direct the attention of applicants for insurance is the theory of predisposition to tubercular diseases. I would ignore all references to a family history of tuberculosis where applicants appear not to be exposed to the danger of infection and where the physique and personal appearance, weight, temperature, pulse and respiratory movement are satisfactory. As I have shown, of those rejected for family history of consumption only 9 per cent. died, against 23 per cent. in our total rejection experience with all classes of risks.

Advice to Risks Rejected for Slight Impairment of Health.

Third. I would not reject absolutely apparently impaired risks falling below the standard of requirements, but postpone the same, and make subsequent reconsideration and acceptance conditional on applicant taking proper care of himself, according to the rules and instructions for chest development, increased weight, etc., which the examiner should furnish to him. No case in the first stages of tuberculosis should be considered hopeless, but plain speaking and definite advice is necessary under the peculiar conditions created by the rejection or postponement of an applicant for incipient phthisis. I know of a number of cases where our examiners have materially improved the physique and vital capacity of risks rejected but subsequently approved, and I have before me a case where within a year a young man rejected for lung disease was entirely cured by home treatment of light gymnastics, proper

diet and fresh air. The average inspiration increased one inch, while the expiration increased half an inch, and two inches were added to the girth.

The Problem of Rejection in Life Insurance.

At the present time about 15 to 20 per cent. of all the risks which present themselves for Ordinary insurance are rejected. For Industrial risks the proportion is, of course, much less; but the problem of rejections is one which must be solved some way, if only for the reason that it represents a large expense to the company, a discouragement to the agent, and a great hindrance to the business. I believe that there is a possible way out of the difficulty by which many of these cases can be dealt with as indicated and be made profitable to the company after a year or two of treatment and right living. Thus the humanity of the proceeding implies the opportunity for financial gain.

Education of the Masses in Disease Prevention.

Fifth. I would deal directly with our policy-holder by means of a number of publications devoted to the subject of disease prevention and cure. I would speak plainly to those in need of advice and make clear the almost absolute certainty of a cure where proper measures are made use of in the first stages of the disease. I would make most of the argument of preventive medicine, that consumption is a dangerous, communicable disease, that it is spread from man to man as the result of criminal carelessness and indifference, that the patient has an absolute duty towards others not to spread the disease, while he owes it as a duty to himself not to re-infect his own system and thus increase the severity of his case. In other words, the literature to be distributed, or perhaps slips to be attached to the premium receipt books, should call attention to the fact that tuberculosis is not hereditary, but a dangerous and communicable disease, with every possible chance of cure if proper measures are taken in the first stages of the disease. I cannot better express my views on this point than by the following extract from a special report on tuberculosis by Dr. Young, of the Maine State Board of Health :—

> "Infection is not only the predominant cause of tuberculosis, but, so far as concerns the prevention of the disease or the prognosis of recovery from it, infection may be considered as the exclusive cause. In the past, heredity was assigned a prominent position among the causes of tuberculosis, but now a large majority of the most eminent medical practitioners and teachers are convinced that direct heredity is but a small etiologic factor, while most of the cases of tuberculosis are referable to infection."

Infection in Factories, Offices, and Houses.

Sixth. I would make clear to the policy-holders the facts of the infectious nature of tubercular diseases, as the same is spread in workshops, offices, and

in houses in which consumptives have died. These points have also been discussed by Dr. Young, from whose report I make the following extract :—

> "At the last French congress on tuberculosis, Dr. Oberthur asserted that tuberculosis contagion among the men in offices, workshops, and factories is very frequent; much more frequent than is often believed. Energetic measures are taken to preserve the lives of workmen from toxic products which surround them. It is none the less necessary to introduce measures against tuberculosis, which causes among the working population far greater ravages in a single year than phosphorus, lead, mercury, fire damp, and machinery in a century."

That the disease infects the houses in which consumptives have lived or died is a fact which has been so clearly established by the researches of Cornet, of Berlin, and Biggs and Pruden, of New York, that I need not attempt to explain the need of special efforts to direct public attention to the danger on the part of the non-infected to rent or buy dwellings without a careful inquiry. If it be true that "such houses [in which consumptives have lived or died] seem to be permanently infected," it stands to reason that special efforts to prevent the disease from spreading should be directed towards a public appreciation of this point, and I would suggest that each year, or at more frequent intervals, Industrial companies at "moving time" distribute through their agents a leaflet bearing on this aspect of the problem, perhaps under the title "Rent only Healthy Homes." By thus educating the public and making house epidemics less frequent, there is no doubt in my mind but that an immense improvement could be brought about by which the mortality from consumption could be materially diminished within a very few years.

Home Treatment of Incipient Phthisis.

Seventh. I would suggest educational literature bearing directly upon the treatment and cure of the disease in its first stages. I have already indicated directions in which advice as to self-treatment has been useful, but I would go further and by means of properly written instructions give plain advice as to the most simple and effective treatment of the disease, even during the second stage. Let the leaflet bearing on this point plainly set forth and make clear the fact that the disease is not climatic, but curable anywhere under otherwise satisfactory conditions, and that the main and all-important principle of treatment is an abundance of fresh air by day and night. I cannot do better than quote on this point from the paper of Dr. Young, previously referred to, as follows :—

> "The most important remedial measure is the breathing of pure air all the time—day and night, summer and winter, whether in the climate of Maine or of California. The patient should be in the open air practically all the time during the day in almost all kinds of weather, and by means of widely open windows he should be the same as in the open air during the night. To many readers the proposition to carry out this treatment in its entirety during the winter weather in this State will

undoubtedly seem harsh, but under intelligent medical supervision, as it always should be, it is practicable, is safe, and in cases which admit of a cure is more efficient than any other method of treatment."

It is a most important point in connection with all matters touching upon questions of treatment and cure that there must be the recognition, as pointed out by Dr. Knopf, that "the great majority of tuberculosis patients cannot, for various reasons, be treated in either sanatoria, special hospitals, or health resorts: and for these their homes will be the only place to seek rest and relief." The fresh air treatment—if necessary, the complete life out of doors—can be arranged for under even the most unfavourable circumstances outside of the very large cities. Tubercular patients should, if possible, live in detached houses, away from crowds, and this is not possible under the conditions of life in the very large cities.

Next to open air the most important element of cure is the question of food, and here we are guided by our experience, which proves that light weight is the rule with persons likely to die from tuberculosis, so much so that the average difference between the tubercular and non-tubercular is about ten pounds. On this point Dr. Knopf remarks as follows:—

"Consumptives, as a rule, have small appetites, and it requires sometimes no little art to make them eat. The one important truth that they should be made to understand is that their digestive powers are far greater than their appetite indicates. Leaving exceptional cases aside, one usually succeeds in making the patients eat by persistent persuasions, and by offering them a variety of food arranged as appetisingly as possible."

As a factor of considerable importance in home treatment of incipient phthisis, we must not ignore pulmonary gymnastics, but a careful consideration of the individual case is necessary for the best results. The patient cannot have too much fresh air, nor can the patient put on too much weight, but it is easily possible that gymnastic exercises may prove as harmful as beneficial, and this view is fully supported by authorities who have considered this question as set forth in the following remarks:—

"Breathing exercises of various kinds have been recommended for both the prevention and as a help in the cure of consumption. Under the close supervision of the medical attendant, respiratory exercises are undoubtedly a useful auxiliary in the treatment of pulmonary tuberculosis. But without careful medical oversight there is great danger that these pulmonary gymnastics may seriously harm the patient.

"Truly, this lung gymnastic is a two-edged sword which must be used judiciously. Many persons recommend deep breathing; the sound part of the lung is exercised for the purpose of improving the general condition, and the thought appears to be logical that the disease process in the portion of the lung in which the respiratory process is well performed has a similar prospect of progression,

"Cornet is equally emphatic in insisting upon caution in the use of respiratory exercises. He says: 'Forced inspiration, widely recommended and much practised, I have for years condemned as dangerous and injurious.' He also refers to the danger that forced, and especially sudden inspirations may aspirate infectious sputum into hitherto healthy parts of the lungs."

I have limited myself to the essentials of home treatment, since the success of all educational work depends on the elimination of all the non-essentials which usually have reference to individual cases. The home treatment, with open air, healthy and abundant food and gymnastic exercise under proper supervision, is within the reach and comprehension of even the most ignorant and indifferent, and I believe that these facts could be so set forth that the propaganda of disease prevention would receive the most powerful aid through the auxiliary agency of Industrial insurance companies.

Sanatoria Treatment of Consumptives.

Finally, as to the cases where home treatment is out of the question, where sanatoria treatment is not only desirable but necessary, it would seem to me possible to frame a brief statement of the facts for general information to be distributed in sections of the country in which this treatment can be obtained. The circular should give information as to the cost and duration of treatment, the general conditions governing admission, the main facts as to the results which have been obtained, and the broad truth that a patient in the early stages of the disease may have every reasonable expectation of being successfully and permanently cured.

Conclusion.

"The enemy can be conquered," wrote Professor Jaccoud—"that is the idea which should engender and sustain every effort. It is certain that this conviction is the first condition of success, since it is the absence of faith in the possibility of cure which prevents the adoption of the therapeutic treatment." It is likewise with all preventive measures. Just in proportion as we place our faith in the ultimate realisation of our ideals shall we be successful in eradicating from the category of important and all-predominating diseases the great "white plague" of modern times. To this end I feel satisfied there will be no difficulty in enlisting the aid and support of the Industrial insurance companies, institutions which have done much and will do more than any other agency for social betterment, to gradually improve the lot, and I hope the length of life, of the average man. While these companies are not philanthropic institutions, and while they cannot erect or maintain sanatoria for consumptives, they can, and will, I am sure, aid you materially to attain the objects for which this Congress has been called together. While I have not been able to assure you of our direct co-operation by making reply in the affirmative to the question asked, I trust that I have made it clear to you that to the extent of its power, and for the best interests of its policy-holders, the Prudential Insurance Company of America will gladly act upon every reason-

able and practicable suggestion or recommendation of this Congress to diminish the disease prevalence and mortality from tuberculosis among its insured and the population at large.

I beg to move the following Resolution: "Whereas it is evident that a further reduction of the preventible mortality from tubercular diseases must be a subject of vast practical and financial importance to Life Assurance Companies and Societies, Resolved by the State section that Life Insurance Companies and Societies, by means of publications or otherwise, should give the largest possible amount of publicity to the most essential and most easily comprehended facts of preventive treatment and cure of tubercular diseases."

Dr. Cooper Pattin (Norwich): I beg to second that.

The Resolution was put and carried unanimously.

THE MORTALITY FROM PHTHISIS AND FROM OTHER TUBERCULAR DISEASES CONSIDERED IN SOME ASPECTS WHICH MAY BE DEMONSTRATED BY MEANS OF LIFE-TABLES.

By T. E. HAYWARD, M.B. (Lond.), F.R.C.S. Eng.,
Medical Officer of Health for Haydock, Lancashire.

At the request of my friend, Dr. Niven, the Medical Officer of Health of the City of Manchester, I have ventured to offer a contribution to the proceedings of this most important Congress.

Here are gathered together those who are most competent to make clear the conditions under which the battle is raging between tubercle bacilli and the human race, to explain how these, it may be, originally saprophytic fungi have acquired the power of existing in and preying upon living animal bodies, and under what circumstances these latter may have their vital resisting power so lowered that they fall a readier prey to their assailants.

Here also are those who, by position and capacity, are best able to plan and arrange details of sanitary administration which shall give effect to the scientific knowledge laboriously attained by those who have made study of life and disease.

Others, too, are here who in various ways have sought to throw light upon the problems involved by means of statistical methods.

There is need on a field of battle for some to be told off to count the numbers of the killed and wounded, and, without unduly exalting the position of statisticians, it may be claimed that those who, in the past as well as at present, have been working at vital statistics have had some share in awakening the great public interest and attention of which this Congress is the outcome.

Exact representations of the numbers of the living who, year by year, are being cut off by the germs of tuberculosis, together with gradually increasing certainty that phthisis and other tubercular diseases are to a very large extent *preventible*, have brought together this great assembly.

The simplest mode of statistical representation, of course, is merely to show how many die out of so many living.

The next step in advance is by classifying the living population and the deaths into age and sex groups to show the special incidence of the mortality from some particular disease on the respective sexes and at different periods of life.

But instead of asking how many die from a disease out of a thousand or million living, we may ask, Supposing that this disease could be made extinct, *how many more would be alive at certain ages, and how much longer would they live?*

Now these questions can be answered by means of Life-Tables.

In some respects this Congress is being held at an unfortunate time. A year or two hence it might have been possible to utilise the data of the Census recently taken, and also the tabulated mortality for the decennium just completed, 1891–1900, and so to have obtained results brought down to a very recent period. As it is, we have to go back to the numerical facts relating to the decennium 1881–90.

What I propose to do is to show how the Life-Table for England and Wales for 1881–90 would have been affected supposing there had been during this period no deaths from phthisis, nor from the other tubercular diseases, and that all the other causes of mortality had retained their proportional intensity.

This is, of course, a mere hypothesis, but it is a necessary working hypothesis. It is possible that the extinction of one kind of disease germs might leave room for the more active development and diffusion of other kinds, but we can only work on the assumption already made that if some one disease should be eliminated, those saved from dying by it during any period will be exposed to the chances of all other diseases in the same proportion as before, and that their average exposure to these chances will be for half the period.

This is not the time or place for going into details as to what a Life-Table is or how it is constructed.

Such knowledge has to be assumed as possessed by those addressed.

I would, however, desire to emphasise the fact that the work of constructing a complete or "extended" Life-Table—that is, one for every separate year of life—entails an enormous amount of laborious calculation, and that if the object be to have not merely *one* but a *series* of Life-Tables to compare with each other, it is practically impossible for one unaided individual to undertake the labour of doing the work by an extended method. The existing duration of life is too short—one would need to be a Methuselah!

Even the late Dr. Wm. Farr, with his untiring industry and with the

staff of trained calculators to help him, employed for the comparative Life-Tables, based on the mortality of England for the decennium 1861–70, which were published in the nt to the Thirty-fifth Annual Report of the Registrar-General, a short ed method, details of which are given in the same Supplement. able 58, page clxviii.)

er point which I would wish to lay special stress upon is that, in be fairly comparable with each other, the Life-Tables *must be calculated same method.* If the occasion permitted, I could give ample proof s by comparative figures worked out from the same data by different ds.

w, in some experimental work on Life-Table calculation, I happened t three years ago to hit upon some very simple modifications of Dr. Farr's original method of constructing a short Life-Table, which gave esults approximating to those of an extended Life-Table with remarkable ess.

a ription of the methods and for comparative figures, in proof, reference may be made to "Public Health," Vol. XI., July nd to the "Journal of the Royal Statistical Society," ., Parts III. and IV., September and December 1899.

iend Dr. A. Newsholme has also done me the honour to insert a n of this method in the last edition of his well-known work on statistics." (See Chapter XXIII., page 279.)

is method the expectation of life can be calculated at quinquennial age-intervals, with results differing by only from 0·01 to 0·10 of a year, from the results obtainable by what I believe to be the most accurate extended method—that is, practically only varying to the extent of from a few days to a few weeks. *Indeed, the results approximate much more closely than do those obtained by extended Life-Tables worked out by different methods.*

It has been, perhaps, necessary to say so much in support of the claim to be made that the method which has been adopted in working out the appended Tables is a sufficiently accurate instrument for statistical research.

Table I., with its three divisions—A, B, and C—is intended to illustrate and support this preliminary claim.

What has been hitherto published at the references already given has relation only to the results in division A; certain other simple devices, by which the short method may be made to yield the results set down in divisions B and C, have only occurred to me while engaged in preparing this communication. At some time ere long I hope to publish the details of the arithmetical methods employed.

The other Tables and Diagrams will, to a large extent, be left to speak for themselves, as time will not permit them to be commented upon in any great detail, and it is therefore only proposed to indicate the most broad and outstanding points.

Before proceeding to direct attention to these Tables, it only remains to

say that the data upon which the calculations have been made are to be found in the Annual Reports and Decennial Supplements of the Registrar-General.

As it seemed desirable to make at least one comparison with an earlier period, I have prepared Tables II. and III., which are intended to demonstrate the effect of excluding phthisis as a cause of mortality in England and Wales during the ten years 1851–60.

Table II. is one of a series as yet unpublished. Table III. has the same relation to Table II. as Table V. has to Table IV.

The comparison serves to further illustrate what already was evident by the ordinary death-rates—that the mortality from phthisis has much diminished.

Some of the decrease may be, of course, only *apparent*—we have to consider the less accuracy of diagnosis at that early period and also possible cyclical variations in the intensity of the disease; but the opinion is at least very generally held that a large proportion of the lessened mortality is *real*, and is the result of improved sanitation and bettered conditions of life.

Attention may be specially directed to the altered sex incidence of this disease, the mortality being greater among females in 1851–60, from age 2 to age 35, whereas, except at ages 4, 5, 10 and 15, during 1881–90 it was greater among males.

The remaining Tables IV. to IX. relate to the ten years 1881–90.

Tables IV., V. and VI. afford answers to these three questions:—Supposing that (1) PHTHISIS and (2) THE WHOLE GROUP OF TUBERCULAR DISEASES had had no existence as causes of mortality in England and Wales during 1881–90, at each of the ages indicated respectively,

(*a*) How much greater would have been the chance of surviving to the end of one year?

(*b*) How many more would be living at each age?

(*c*) How much greater would be the mean expectation of life, or, in other words, the mean after-lifetime at each age?

Diagrams A and B are intended to graphically represent the answers to the last two questions. With regard to the l_x columns—that is, the successive numbers of survivors at age x—it must be borne in mind that the results of the short method are more and more in excess of those obtained by the extended method from about age 25 onwards. However, as the three Tables IV., V. and VI. are worked out by the same method, the results are fairly comparable in their proportions to each other.

The $\mathring{e}_x$ columns are of the greatest importance, and these, as has been shown, are practically identical with those to be obtained by the extended method.

The fact which stands out from all others is that *if there had been no phthisis, the average length of life for each individual born would have been increased by two and a half years!*

Another prominent fact is that *those who have survived to the age of fifteen would have their average expectation of life increased by about three years and a quarter!*

hypothetical results are greater than those which would be
olishing the whole group of ailments which used to be classed
e seven principal zymotic diseases."

the three diseases to combat which the expensive machinery
, nospitals chiefly exists—viz., typhoid fever, scarlet fever, and
ia—if they could be entirely exterminated, the average increase in
f life of those at birth would only be increased by about a year,
nose at age 15 would only have about the fourth part of a year to add to
ife expectation.

e VI. brings out prominently the fact that the group of tubercular
eases other than phthisis exert their maximum effects at the earlier ages
ese being more marked during the first five years, and after age 15
ng comparatively insignificant.

re is another aspect, however, under which the increased length of life
ght about by doing away with phthisis may be considered.

it has been seen from Table V. that those at the very outset of life would
the average have two and a half years longer to live. Now, it is of
nce to ascertain if possible how much of this added life would be
u during the part of life extending from age 15 to age 65, which may
considered as the *working period* of life? This question is answered by
e VII., which shows that the *working period of life would be lengthened on average by very nearly two years.*

The matter may be illustrated in yet another way. The E_x values in Tables IV., V. and VI. apply to those *at the exact age* x, but if these values can be translated into those applying to age-groups, that is into average values of expectation of life with relation to all the individuals at all ages from x to $x + n$ comprised within the respective age-groups x to $x + n$ (for example, from birth to age 5, from age 5 to age 10, etc.), we shall then have a ready method of calculating what has been happily termed the "*life-capital*" of a whole community.

In Table VIII. such values have been worked out, and in Table IX. they have been used to show what was the total life-capital of the population of England and Wales as it existed at the middle of the year 1891, and to what extent the life-capital would have been increased (1) by abolishing phthisis and (2) by doing away with all other tubercular diseases. Diagram C also represents the results graphically to scale.

Diagrams A, B, and C, it will be noted, all relate to the male section of the population. On such a scale as it is possible to employ, no very great differences would appear when contrasted with similar diagrams constructed for the female section of the population, and, therefore, it has seemed needless to duplicate the diagrams. One other diagram, D, shows the proportions between the total life-capital for both sexes and at all ages.

However, *the one striking and outstanding fact, which cannot be emphasized more than by the mere statement of it, is that, if phthisis had not existed as a cause of mortality in England and Wales, every person living in the year* 1891 *would have had an average increase in life-capital of two years, and that the*

abolition of all other tubercular diseases would only have increased the average life-capital by the fifth part of a year.

The question may now be asked, Are there any practical conclusions and deductions to be drawn from the statistical points which it has been sought to establish and represent?

Now, years of human life are capable of being translated into terms of pounds, shillings, and pence, and it is evident that the ravages of phthisis must entail a very serious financial loss to the community.

About three years ago, after reading a paper upon "Life-Table Construction" before the Royal Statistical Society, I was met by a criticism—good-humouredly, but at the same time pointedly made by a member of the actuarial profession present—that it would be better for a doctor to stick to his stethoscope, and not meddle with matters which properly belong to actuaries.

My reply was to the effect that, whatever might be the case with medical men as practitioners, it was certainly open to a medical officer of health to utilise such little mathematical knowledge as he might possess in demonstrating the relations between lives and deaths.

Should he, as only too probably he may, come short of the mathematical skill of the actuary, he may gratefully accept such correction as the latter may be able to give. But when it comes to translating years of life into pecuniary value, the writer gladly concedes that this is the special province of the actuary, and one for the so able dealing with the community owes to him a debt of gratitude. Therefore I can make no attempt to measure the financial loss due to phthisis, or the possible gain by abolishing or considerably mitigating the effect of this disease.

I would simply desire to represent to those concerned with the management of the Industrial and other life assurance societies that it might be not merely an act of benevolence and charity, but one of self-interest and profit, to subscribe something towards the establishment and maintenance of sanatoria for the treatment of phthisis, so as to aid in the restoration to health and the prolongation of life of those who are stricken with this disease, and at the same time, to be limiting the diffusion of the infective germs to others. This course would not be without precedent, for such aid is already given in Germany. It is only the adoption of a similar principle to that long ago acted upon in their own self-interest by companies insuring against loss by fire—viz., to either maintain fire brigades of their own, or to subscribe largely to those established by municipal enterprise.

TABLE I.

Showing comparison of Life-Table results as regards *mean expectation of Life* obtained by (*a*) an extended method, and (*b*) the modified short method used in the construction of the succeeding Tables.

The foundation data are those for England and Wales 1881–90, but for (*a*) the official Life-Table has been modified by the calculation of a new set of p_x values from p_5 to p_{25}, the other p_x values having been left unaltered.

A.—Expectation of Life or mean after-lifetime at exact age x.

Age.	Males.			Females.		
x.	a.	b.	Differences of b from a.	a.	b.	Differences of b from a.
0	43·28	43·32	+0·04	46·66	46·67	+0·01
5	52·24	52·30	+0·06	54·26	54·27	+0·01
10	48·59	48·65	+0·06	50·64	50·65	+0·01
15	44·28	44·33	+0·05	46·40	46·40	±0·00
25	36·28	36·34	+0·06	38·50	38·51	+0·01
35	28·91	28·87	−0·04	31·16	31·08	−0·08
45	22·06	22·04	−0·02	24·05	24·01	−0·04
55	15·74	15·71	−0·03	17·23	17·12	−0·11
65	10·31	10·24	−0·07	11·26	11·17	−0·09
75	6·10	6·06	−0·04	6·68	6·62	−0·06
85	3·29	3·32	+0·03	3·71	3·69	−0·02
95	1·72	1·72	±0·00	2·05	1·97	−0·08

B.—Showing how the total expectation of Life at Birth is distributed with respect to the age-periods indicated.

	Males.			Females.		
Age-period.	a.	b.	Differences of b from a.	a.	b.	Differences of b from a.
0– 5	4·02	4·02	±0·00	4·16	4·16	±0·00
5–15	7·33	7·34	+0·01	7·63	7·65	+0·02
15–25	7·05	7·03	−0·02	7·35	7·33	−0·02
25–35	6·62	6·61	−0·01	6·90	6·89	−0·01
35–45	5·97	5·97	±0·00	6·30	6·30	±0·00
45–55	5·10	5·10	±0·00	5·55	5·54	−0·01
55–65	3·91	3·91	±0·00	4·49	4·48	−0·01
65–	3·28	3·34	+0·06	4·28	4·32	+0·04
Total	43·28	43·32	+0·04	46·66	46·67	+0·01

C.—Mean expectation of Life of the individuals at all ages from x to $x + n$ comprised within the age groups x to $x + n$ indicated.

Age Groups x to $x + n$.	Males.			Females.		
	a.	b.	Differences of b from a.	a.	b.	Differences of b from a.
0– 5	51·76	51·76	±0·00	54·07	54·07	±0·00
5–10	50·57	50·58	+0·01	52·60	52·56	−0·04
10–15	46·43	46·49	+0·06	48·52	48·53	+0·01
15–25	40·27	40·33	+0·06	42·44	42·46	+0·02
25–35	32·60	32·61	+0·01	34·83	34·82	−0·01
35–45	25·51	25·48	−0·03	27·66	27·65	−0·01
45–55	18·95	18·93	−0·02	20·67	20·63	−0·04
55–65	13·09	13·06	−0·03	14·30	14·24	−0·06
65–75	8·35	8·34	−0·01	9·08	9·06	−0·02
75–85	4·94	4·94	±0·00	5·41	5·41	±0·00
85–95	2·80	2·78	−0·02	3·16	3·11	−0·05
95–	1·57	1·62	+0·05	1·86	1·87	+0·01

TABLE II.

Life-Table for England and Wales for the decennium 1851–60, based on the true mean numbers living deduced from the census returns of 1851 and 1861,* and on the deaths from all causes during the ten years 1851–60.

Age.	Chance of living one year in the interval from Age x.		Number of Survivors at Age x out of a million born.		Expectation of Life or mean after-lifetime at Age x, expressed in years.	
	p_x.		l_x.		E_x.	
x	Males.	Females.	Males.	Females.	Males.	Females.
0	·83236	·86227	1,000,000	1,000,000	42·06	42·15
1	·93537	·93820	832,364	862,266	47·06	47·82
2	·96502	·96527	778,567	808,980	49·28	49·93
3	·97607	·97596	751,336	780,882	50·04	53·71
4	·98225	·98222	743,353	762,110	50·26	50·95
5	·99149	·99158	720,337	748,559	50·16	50·86
10	·99512	·99494	690,211	717,585	47·24	47·95
15	·99230	·99205	673,528	699,616	43·35	44·12
25	·99046	·99010	623,450	645,945	36·43	37·37
35	·98754	·98786	566,449	584,755	29·51	30·77
45	·98212	·98483	499,705	517,529	22·80	24·12
55	·96944	·97322	417,238	444,190	16·34	17·30
65	·93646	·94276	305,883	338,585	10·53	11·19
75	·86297	·87380	158,655	187,797	6·03	6·45
85	·73198	·74700	36,343	48,731	3·29	3·48
95	·55138	·56783	1,605	2,637	1·73	1·81

TABLE III.

Showing the differences from Table II. produced by excluding phthisis as a cause of mortality in England and Wales during 1851–60.

Age.	Chance of living one year in the interval from Age x.		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x, expressed in years.	
	p_x.		l_x.		E_x.	
x	Males.	Females.	Males.	Females.	Males.	Females.
0	+·00206	+·00188	...	...	+3·37	+4·01
1	+·00171	+·00166	+ 2,053	+ 1,882	+3·92	+4·54
2	+·00097	+·00100	+ 3,352	+ 3,201	+4·09	+4·75
3	+·00059	+·00063	+ 3,987	+ 3,901	+4·19	+4·86
4	+·00050	+·00058	+ 4,336	+ 4,301	+4·25	+4·94
5	+·00052	+·00062	+ 4,629	+ 4,670	+4·30	+5·00
10	+·00076	+·00129	+ 6,270	+ 6,718	+4·35	+5·04
15	+·00317	+·00388	+ 8,712	+11,132	+4·26	+4·83
25	+·00400	+·00454	+28,508	+36,414	+3·16	+3·41
35	+·00396	+·00414	+50,256	+61,887	+2·06	+1·99
45	+·00376	+·00308	+66,567	+79,212	+1·14	+0·97
55	+·00321	+·00230	+73,966	+84,209	+0·51	+0·40
65	+·00217	+·00152	+66,361	+73,829	+0·16	+0·12
75	+·00079	+·00062	+38,931	+44,631	+0·04	+0·02
85	+·00034	+·00031	+ 9,433	+12,010	+0·01	+0·01
95	—	—	+ 421	+ 663	—	—

* For method used to obtain mean population numbers see a paper by Mr. A. C. Waters in the "Journal of the Royal Statistical Society," July, 1901.

TABLE IV.

b England and Wales for the decennium 1881–90, based on the official Life-Table, but calculated by the same modified short method as that used for the other Tables in the series.

x.	Chance of living one year in the interval from Age x.		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x, expressed in years.	
	p_x.		l_x.		E_x.	
	Males.	Females.	Males.	Females.	Males.	Females.
0	·83896	·86887	1,000,000	1,000,000	43·32	46·67
1	·94270	·94729	838,964	868,874	50·56	52 66
2	·97617	·97700	790,891	823,072	52·61	54·56
3	·98461	·98487	772,046	804,142	52·88	54·83
4	·98859	·98898	760,167	791,973	52·70	54·66
5	·99467	·99475	751,494	783,244	52·30	54·27
10	·99705	·99689	731,669	762,910	48 65	50·65
15	·99504	·99504	720,942	751,135	44·33	46·40
25	·99226	·99265	685,947	714,724	36·34	38·51
35	·98768	·98946	634,654	663,880	28·87	31·08
45	·98080	·98500	560,634	597,164	22·04	24·01
55	·96587	·97192	461,836	513,384	15·71	17·12
65	·93190	·94132	326,327	386,134	10·24	11·17
75	·86328	·87726	161,189	210,907	6·06	6·62
85	·73462	·76126	37,056	56,934	3·32	3·69
95	·54941	·59522	1,696	3,721	1·72	1·97

TABLE V.

Showing the difference from Table IV. produced by excluding phthisis as a cause of mortality in England and Wales during the ten years 1881–90.

Age.	Chance of living one year in the interval from Age x.		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x, expressed in years.	
	p_x.		l_x.		E_x.	
x.	Males.	Females.	Males.	Females.	Males.	Females.
0	+·00088	+·00076	-		+2·58	+2·57
1	+·00074	+·00072	+ 874	+ 758	+3·02	+2·90
2	+·00039	+·00037	+ 1,442	+ 1,345	+3·15	+3·02
3	+·00030	+·00027	+ 1,710	+ 1,619	+3·21	+3·07
4	+·00023	+·00026	+ 1,883	+ 1,816	+3·24	+3·11
5	+·00025	+·00033	+ 2,039	+ 2,007	+3·27	+2·12
10	+·00034	+·00070	+ 2,912	+ 3,209	+3·29	+3·11
15	+·00177	+·00205	+ 4,113	+ 5,810	+3·26	+2·98
25	+·00301	+·00278	+16,284	+20,510	+2·58	+2·19
35	+·00352	+·00271	+35,065	+38,420	+1·75	+1·29
45	+·00342	+·00202	+52,430	+52,048	+0·96	+0·61
55	+·00278	+·00146	+61,072	+56,299	+0·41	+0·25
65	+·00164	+·00089	+53,939	+48,815	+0·12	+0·08
75	+·00059	+·00036	+29,988	+28,936	+0·02	+0·01
85	+·00018	+·00013	+ 7,195	+ 8,074	+0·01	±0·00
95	—	—	+ 334	+ 535	—	—

TABLE VI.

Showing the difference from Table IV. produced by excluding phthisis and all other tubercular diseases as causes of mortality in England and Wales during the ten years 1881–90.

Age.	Chance of living one year in the interval from Age x.		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x, expressed in years.	
x.	p_x.		l_x.		E_x.	
	Males.	Females.	Males.	Females.	Males.	Females.
0	+·01007	+·00785	..	..	+3·86	+3·72
1	+·00639	+·00524	+10,062	+ 7,844	+3·94	+3·76
2	+·00274	+·00228	+14,910	+12,025	+3·79	+3·65
3	+·00156	+·00143	+16,762	+13,654	+3·72	+3·60
4	+·00123	+·00113	+17,734	+14,621	+3·69	+3·58
5	+·00081	+·00087	+18,486	+15,375	+3·66	+3·54
10	+·00063	+·00103	+21,062	+18,375	+3·54	+3·39
15	+·00196	+·00226	+23,092	+22,064	+3·44	+3·18
25	+·00314	+·00291	+36,087	+37,855	+2·73	+2·29
35	+·00363	+·00282	+54,825	+55,929	+1·81	+1·35
45	+·00352	+·00210	+71,201	+68,943	+0·99	+0·64
55	+·00288	+·00154	+77,658	+71,616	+0·42	+0·26
65	+·00173	+·00096	+66,416	+60,874	+0·12	+0·09
75	+·00063	+·00040	+36,432	+35,769	+0·02	+0·01
85	+·00019	+·00015	+ 8,706	+ 9,962	+0·01	±0·00
95	—	—	+ 404	+ 660	—	—

TABLE VII.

Showing how the increased expectation of Life at Birth represented in Table V. as produced by eliminating phthisis would be distributed over the periods of life indicated, and also a comparison with a similar distribution of the expectation of Life at Birth calculated in Table IV.

Life Period.	Age-limits of Period.	Length of Period in Years.	Males.			Females.		
			Values from Table IV. b.	Values from Table V. c.	Differences of c from b.	Values from Table IV. b.	Values from Table V. c.	Differences of c from b.
Infancy	0– 5	5	4·02	4·02	±0·00	4·16	4·17	±0·01
School-age	5–15	10	7·34	7·37	+0·03	7·65	7·69	+0·04
Working Period of Life	15–25	50	7·03	7·14	+0·11	7·33	7·46	+0·13
	25–35		6·61	6·86	+0·25	6·89	7·19	+0·30
	35–45		5·97	6·41	+0·44	6·30	6·75	+0·45
	45–55		5·10	5·67	+0·57	5·54	6·09	+0·55
	55–65		3·91	4·49	+0·58	4·48	5·00	+0·52
Totals for Working Period of Life			28·62	30·57	+1·95	30·54	32·49	+1·95
Decline	65 and upwards	—	3·34	3·94	+0·60	4·32	4·89	+0·57
Total	All ages	—	43·32	45·90	+2·58	46·67	49·24	+2·57

TABLE VIII.

Showing the results of Tables IV., V. and VI. reworked out so as to mean expectation of life possessed by the individuals at all ages from $x + n$ comprised within the respective age groups x to $x + n$ indicated.

(The values deduced from Table IV. are headed by (*b*); the differences produced by eliminating phthisis are headed by (*c*); and the differences produced by eliminating phthisis and all other tubercular diseases by (*d*).)

Age Groups x to $x + n$.	Males.			Females.		
	(*b*)	(*c*)	(*d*)	(*b*)	(*c*)	(*d*)
0– 5	51·76	+2·680	+3·390	54·07	+2·380	+3·070
5–10	50·58	+3·280	+3·600	52·56	+3·115	+3·465
10–15	46·49	+3·275	+3·490	48·53	+3·045	+3·285
15–25	40·33	+2·920	+3·085	42·46	+2·585	+2·735
25–35	32·61	+2·165	+2·270	34·82	+1·740	+1·820
35–45	25·48	+1·355	+1·400	27·65	+0·950	+0·995
45–55	18·93	+0·685	+0·705	20·63	+0·430	+0·450
55–65	13·06	+0·265	+0·270	14·24	+0·165	+0·175
65–75	8·34	+0·070	+0·070	9·06	+0·045	+0·050
75–85	4·94	+0·015	+0·015	5·41	+0·005	+0·005
85–95	2·78	+0·005	+0·005	3·11	±0·000	±0·000
95–	1·62	±0·000	±0·000	1·87	±0·000	±0·000

TABLE IX.

Showing, expressed in years, the total Life capital in England and Wales at the middle of the year 1891, and to what extent this Life capital would have been increased by eliminating (1) phthisis and (2) all other tubercular diseases as causes of mortality.

(The calculations have been based (1) on the numbers given in the preceding Table VIII.; and (2) on the numbers given in the census report, 1891, Vol. IV., Table 12, page 106, as representing the estimated population of England and Wales living at the middle of the year 1891, classified into age and sex groups.)

Life capital deduced from Table IV. is headed by (*b*), addition by eliminating phthisis by (*c*), and further addition by eliminating all other tubercular diseases by (*d*).

Age Groups.	Males.			Females.		
	(*b*)	(*c*)	(*d*)	(*b*)	(*c*)	(*d*)
0– 5	91,741,447	4,750,137	1,258,431	96,831,667	4,262,241	1,235,691
5–10	85,887,276	5,569,598	543,375	89,694,020	5,315,770	597,277
10–15	75,095,517	5,290,124	347,291	78,480,820	4,924,256	388,119
15–25	109,697,880	7,942,420	448,801	122,824,802	7,477,675	433,908
25–35	68,310,689	4,535,193	219,952	79,913,154	3,993,363	183,603
35–45	41,163,557	2,189,035	72,699	47,626,288	1,636,346	77,511
45–55	22,622,863	818,630	23,902	26,998,237	562,736	26,174
55–65	10,085,599	204,617	3,861	12,664,018	146,739	4,447
65–75	3,720,674	31,229	0	4,951,028	24,591	0
75–85	720,608	2,188	0	1,049,957	970	0
85–95	44,116	79	0	82,788	0	0
95–	642	0	0	1,793	0	0
Total at all Ages	509,090,868	31,333,250	2,918,312	561,118,572	28,344,687	2,946,730

Sums of Males and Females—(*b*) 1,070,209,440; (*c*) 59,677,937; (*d*) 5,965,042.

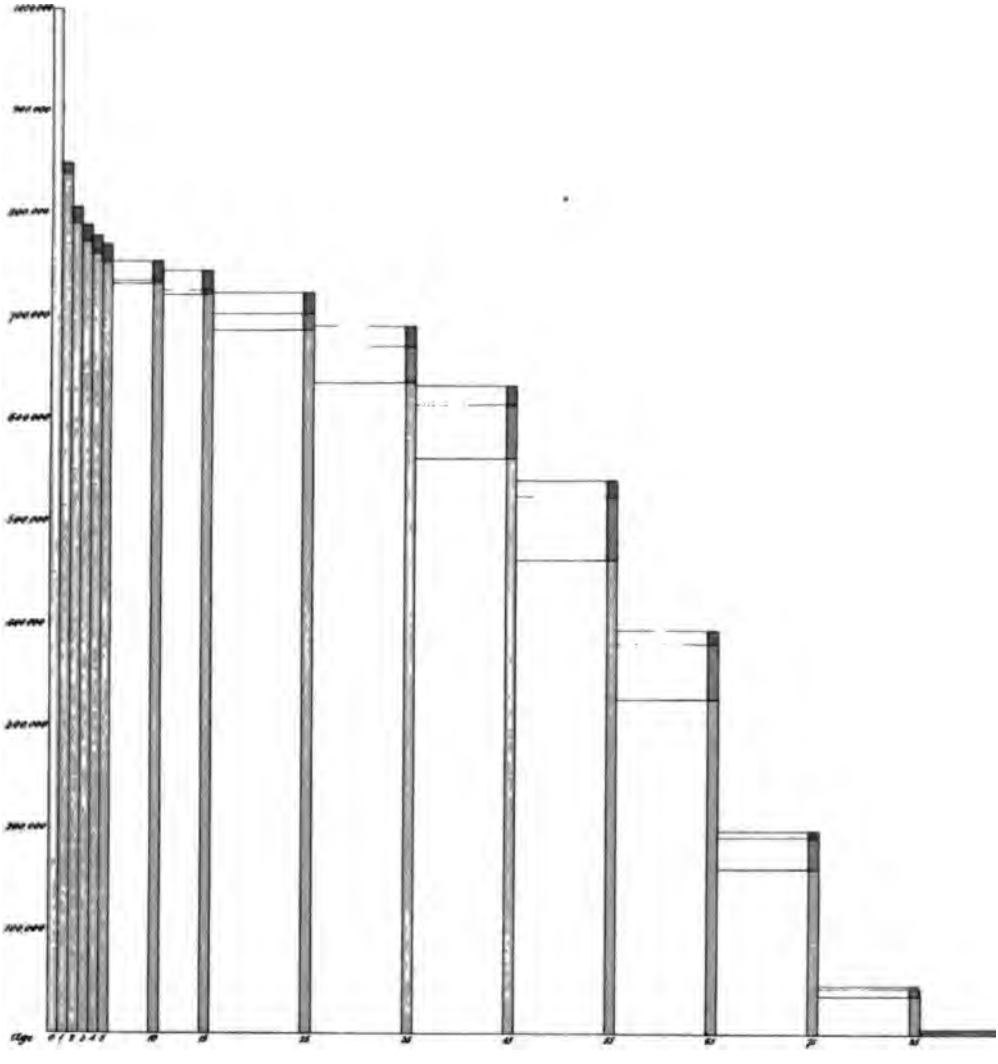
Diagram A

representing to scale the Male columns of Survivors in Tables IV, V, and VI.

indicates number of survivors according to Table IV.

increased number of survivors after excluding Phthisis

still further increased number of survivors after excluding all other Tubercular Diseases



by
Dr. J. E. Hayward.

Diagram 2.

representing to scale the Expectation of Life for Males as shown in Tables IV. V. and VI

indicates expectation of life according to Table IV.

increased expectation of life after excluding Phthisis

still further increased expectation of life after excluding all other Tubercular Diseases.

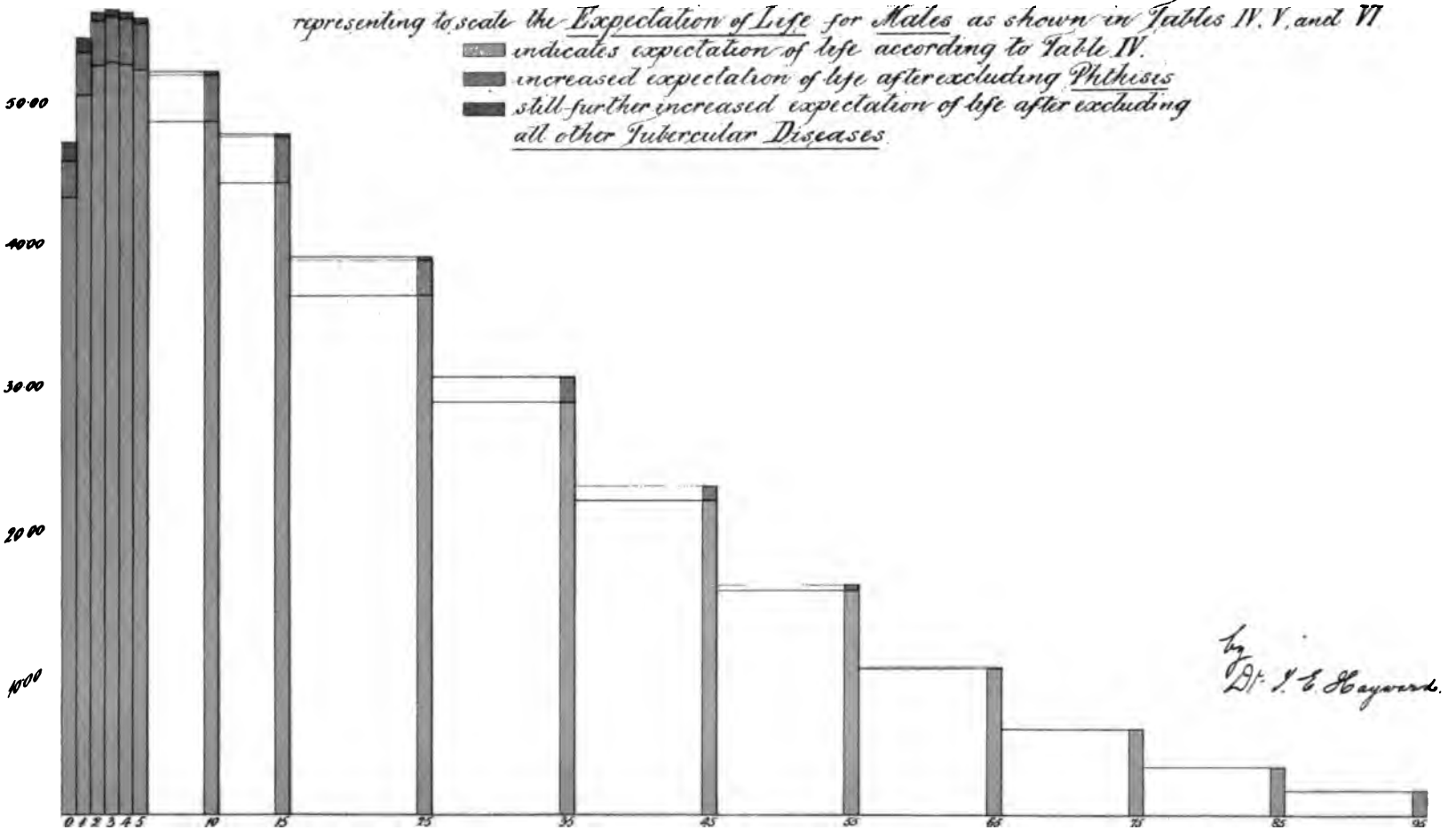


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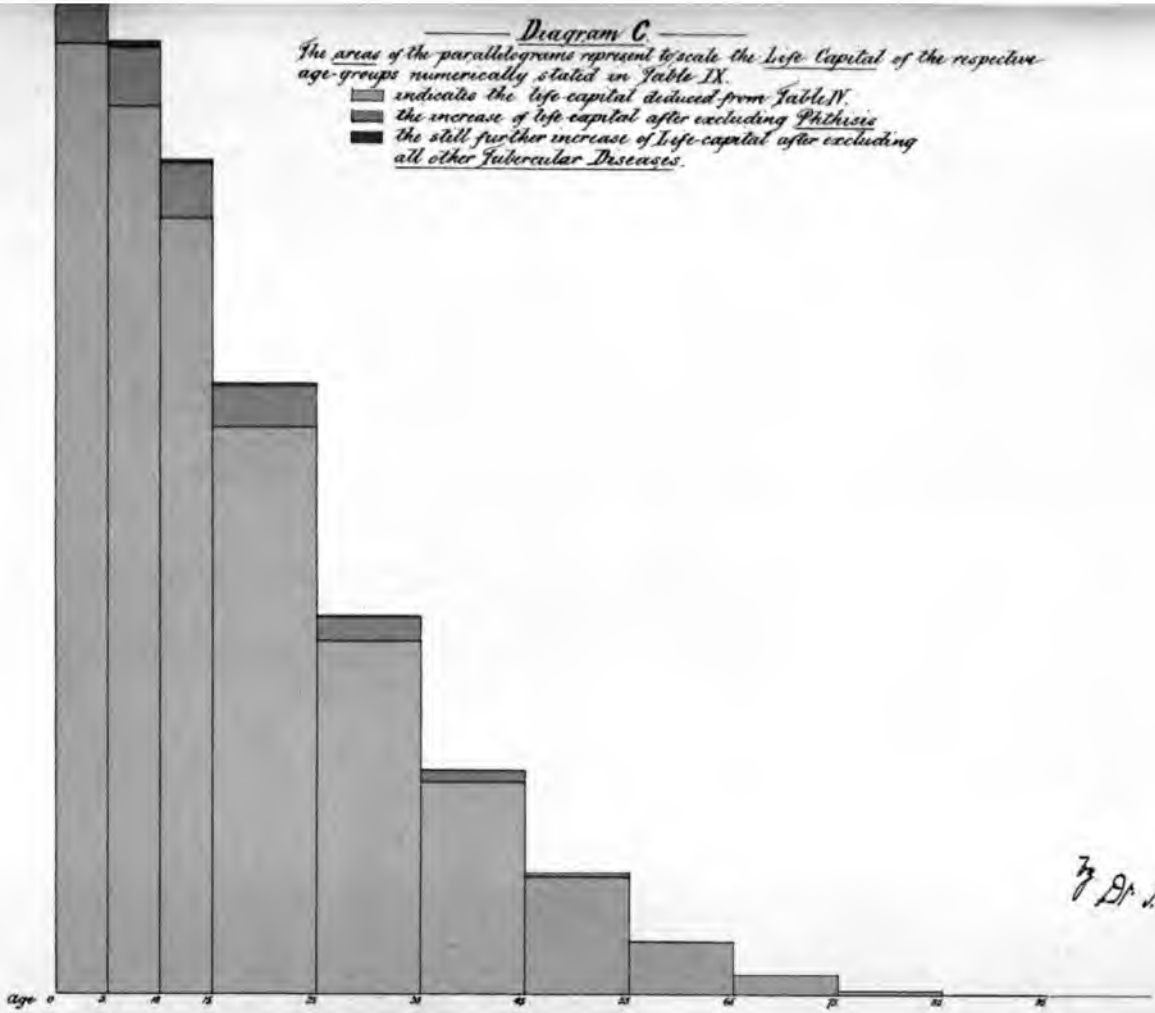
Diagram C.

The areas of the parallelograms represent to scale the Life Capital of the respective age-groups numerically stated in Table IX.

indicates the life-capital deduced from Table IV.

the increase of life-capital after excluding Phthisis

the still further increase of Life-capital after excluding all other Tubercular Diseases.



By Dr. J. C. Hayward

Diagram D.

represents to scale the Total Life-capital for England and Wales at the middle of the year 1891.

the increase of Life-capital after excluding Phthisis.

the still further increase of Life capital after excluding all other Tubercular Diseases.

by Dr. J. E. Hayward.

TABLE IX.—*continued.*

	Average Life Capital for each Individual living.			Proportion per cent. of Life Capital expended in a Year.		
	(b)	Increase by eliminating Phthisis. (c)	Further Increase by eliminating all other Tubercular Diseases. (d)	(b)	With Phthisis eliminated.	With Phthisis and all other Tubercular Diseases eliminated.
Males . .	36·13	2·22	0·21	2·768	2·608	2·594
Females . .	37·43	1·89	0·20	2·672	2·543	2·530
Persons . .	36·80	2·05	0·21	2·718	2·574	2·560

THE PROVISION OF SANATORIA, WITH REFERENCE TO SOME OF THE DIFFICULTIES WHICH ARISE IN ASSISTING THE PHTHISICAL POOR.

By Lieut.-Colonel MONTEFIORE.

So many men far abler than myself have written and spoken on the subject of the provision of sanatoria that it would be out of place were I to dwell long upon it. A few words, however, may be permitted to me.

Although the development of the sanatorium or open-air treatment of tuberculosis has been greater and more rapid on the Continent and in America than in this country, it is a fact that our medical men long ago acknowledged that good air and good food, and plenty of both, were the best preventives of phthisis, as well as of many other diseases; and indeed it must be noted that as long ago as 1840 a surgeon, Mr. Bodington, opened a sanatorium where those suffering from pulmonary consumption were treated on similar lines to those which are now so generally advocated.

We are also told, and believe with pride, that the basis upon which the Germans have founded their deep knowledge of tuberculosis was constructed to a large extent upon the teachings in sanitary science of such great Englishmen as Sir John Simon and the late Sir George Buchanan. It is generally agreed, however, that the honour of having first systematised the sanatorium treatment must be given to Dr. Brehmer, who, in 1859, commenced the institution which bears his name, at Görbersdorf, in Southern Silesia. His example was followed, but not quickly, and now there are many well-known sanatoria in Germany, such as Falkenstein, near Frankfort-on-the-Main, under Dr. Dettweiller, and Nordrach, in the Black Forest, under Dr. Walther. It was only comparatively recently, however, that sanatoria for the poorer people were built and maintained all over Germany.

don-Sanderson has spoken so strongly and wisely in the s he delivered at Oxford on "Our Duty to the Consumptive Bread-ner," that I cannot do better than to quote from it. He stated that ermany has recognised that sanatoria are a necessity for the consumptive patient, and in that country the number of these institutions has rapidly increasing during the last ten years, while in this country any, or a very few, sanatoria for the working classes yet exist. told us that in the year 1900 there were forty-nine sanatoria for poor in Germany, containing 4,000 beds; the cost of their erection was about a million pounds. The yearly expenditure is about a quarter of a million pounds, and it is anticipated that, when the system is complete, its maintenance will cost from a million to a million and a half pounds annually—that is, that this enormous sum will be required to bring within the reach of every working man and woman in Germany who is hreatened with phthisis the means of doing the best that can be done for the maintenance of his or her earning capacity.

In 1884 the Saranac Lake Sanatorium, in the Adirondack Mountains of the United States, was opened, and there are now many others in the States. In France and other parts of the Continent these institutions have been established, and the Sanatorium d'Angicourt, built by l'Assistance Publique, was opened last year, with accommodation for fifty people, but on completion it will hold 200.

So we see that on the Continent and in the United States much has been done, and more is likely to be carried out, to provide sanatoria for those able to pay high fees, as well as for those who can only afford a very small payment indeed.

In Germany, compulsory assurance is no doubt a large factor in the sanatorial system, and the assurance societies have given an enormous impetus to the development of sanatoria. It is also a fact that the medical profession in Germany and other parts of the Continent have more thoroughly aroused the enthusiasm and more strenuously directed the opinion of the public, than they have hitherto done in this country; and it is because I and others hope so much in this direction from the British Congress on Tuberculosis now sitting that I venture to place before you a few of the difficulties met with in attempting to ameliorate the condition of a phthisical working-class bread-earner.

Working-class people who suffer from phthisis are sent by their general medical practitioner or club doctor to the special hospitals for that disease, where large numbers of them are treated as out-patients, and a few—those where the disease is rather more advanced—are admitted to the wards if they can secure the ever-necessary in-patient's letter. On leaving the hospital, or on ceasing to attend as out-patients, they are often recommended to go to a convalescent home or a sanatorium, and it is at this juncture that the patients come to us for assistance to carry out the wishes of their medical advisers; but these wishes now differ a great deal. Some physicians are still content with a short stay in a warm place for their patient, whereas another asks for the

open-air treatment in a bracing climate. Many say seaside, in the South of England, is the most favourable, and others prefer inland. The convalescent homes for consumption are very few; the number of sanatoria for the working class, if not quite non-existent, certainly entirely inadequate. Homes for ordinary convalescents have shut their doors against consumptives, rightly acting on the lessons taught them by the National Association for the Prevention of Tuberculosis, and even if these homes did not act thus, we certainly should feel bound ourselves not to send them phthisical patients. The general public does not yet understand that phthisis is infectious, for do they not see that at the special hospitals for this disease, where the most distinguished medical men and the greatest experts are to be found, patients suffering from any chest disease are admitted with those who are phthisical, and it certainly puzzles them. This question of the degree of infectivity will, no doubt, be deeply considered at this Congress.

The paucity of homes or of sanatoria spells delay for the patient, which in many cases, as far as a layman can judge, means losing the one chance of arresting the disease.

It was stated at the Berlin Congress on Tuberculosis in 1891 that phthisis had increased in every European country except Great Britain during the last forty years, and that in Great Britain the mortality from this disease had declined by 50 per cent. within that time. Notwithstanding that decrease, it was stated by Dr. James Alexander Lindsay, in his address on the "Problem of the Consumptive Poor," at the opening of the Session of the Ulster Medical Society in 1897, that there were in these islands 200,000 persons suffering from phthisis who might be expected to seek hospital relief, and that, after careful consideration, he said that there was only one bed for every 200 phthisical patients who might be expected to demand and require hospital relief; and, in order to prove that he had not exaggerated, he quoted from Sir Hermann Weber that "well-arranged special hospitals for the treatment of consumption have accommodation only for one sufferer in a thousand." Dr. Walters, in his "Sanatoria for Consumptives," estimates the total number of beds for poor consumptives in hospitals and homes at 1,270, which would be, if we accept the figures given by Dr. Lindsay, one bed to 1,590 people, but we know that our hospitals admit persons suffering from other diseases than phthisis to their wards, which fact much reduces the available accommodation for the consumptive poor. When we look for the special sanatoria to which to send our poor sufferers, we find how few they are, and how difficult it is to get admission for a patient to them.

If there were an adequate number of sanatoria, the special hospitals would be much relieved, their position would become readjusted, they might become more like clearing-houses, the patients being sent either to the wards for observation and treatment, or direct to the country sanatoria.

I have been at some pains to collect opinion as to the value of treatment at hospitals for phthisical patients as compared with special sanatorium treatment, and the following table is the result :—

Number of Physicians.	Number of Hospitals.	Number of Consumptives seen.	Number who were Incurable or very Ill.	Number where Disease might be Arrested by, or were Suitable for, Out-Patient Treatment.	Number where Disease might be Arrested by, or were Suitable for, In-Patient Treatment.	Number suitable for Treatment at Special Sanatoria.	[illegible]
10	3 (Special Hospitals).	554	139 or *25·09 %	46 or *8·30 % †11·08 %	33 or *5·95 % †7·95 %	291 or *52·52 % †70·12 %	45 or *8·12 % †10·84 %
6	3 (General Hospitals with Schools).	73	37 or *50·68 %	4 or *5·47 % †11·1 %	.. .. ..	29 or *39·72 % †80·5 %	3 or *4·10 % †8·3 %
(Totals)— 16	6	627	176 or *28·07 %	50 or *7·97 % †11·08 %	33 or *5·26 % †7·31 %	320 or *51·13 % †70·95 %	48 or *7·65 % †10·64 %

* Percentage on number of consumptives seen.

† Percentage on number of consumptives seen in which the disease might be arrested.

No doubt the low figures given by the medical men as to the patients who were suitable for treatment at the hospital as out-patients, was due to the fact that phthisis is now believed to be best treated hygienically, and this is impossible where nothing is known of the home conditions of the patient.

It will be noted in the total after deducting the number of those who were incurable or very ill (176) from the number of phthisical patients seen (627), 11·08 per cent. of the remainder were those whose disease might be arrested by, or who were suitable for, the hospital out-patient treatment; in 7·31 per cent. it was thought that by in-patient treatment the disease might be arrested, so that whereas the hospital might be useful to eighty-three people, or 18·39 per cent., the hope of improvement by the special sanatorium method extends to 320 persons, or 70·05 per cent., and the chance of the recovery of those who might be sent to ordinary convalescent homes exists in forty-eight people, or 10·64 per cent.

If this be true for small numbers, is it not probable that it is so for the thousands of patients that flock for rescue to our hospitals? Surely some alteration should be made in the system. Sir J. Burdon-Sanderson should again be heard on this matter. In the address of which I have already spoken, he says:—"Unfortunately, the same vicious principle which prevails in the administration of other medical charities supported by voluntary contributions is all-powerful in our hospitals for consumption. Benefactors are not satisfied with the assurance that their gifts are administered by competent persons in the most effectual way for securing the end which they profess to have in view. They are unwilling to forego their undeniable right to do what they will with their own. Like those charitable donors of whom we read in Holy Scripture, they must needs 'keep back part of the price'—not indeed in the form of money, but in the exercise of a paltry kind of patronage.

"What is required is, roughly, that there should be a haven of refuge in every industrial centre (consisting of a hospital ward or a hospital) to which the needs of the sufferer—in this case the existence of the physical sign and symptoms of advancing phthisis—should be the only claim for admission, and that every admission should be conditional on liability to removal at the discretion of the medical authority in charge. By the enforcement of this condition, the risk of converting the temporary refuge into a permanent asylum would be guarded against, while at the same time the workman who had found the tide of adversity too strong for him would be enabled to regain his footing, and once more resume the struggle, if not with renewed vigour, at least with some renewal of hope and courage.

"Now it cannot be said," he continues, "that anything effectual has yet been done in the direction I have indicated. In London, the phthisical workman has no great difficulty in obtaining an out-patient letter for a general or special hospital; but from the moment that the progress of his disease renders him unable to attend, his position becomes a painful one. The nature of his disease shuts against him the doors of the general hospital, and

he obtains an 'in-patient's letter' for a special hospital, the lue regard for the rights of governors necessarily entails is loes not arrive at his desired haven until too late. Prompt have restored him to comparative health, but the time for eatment has been spent under the unfavourable conditions of his he has not only undergone suffering that might have been has been a source of danger to his neighbours. The risk of a ent with acute symptoms to live among others is, indeed, y of the detriment to himself, a sufficient reason for his immediate m his surroundings."

gard to the ordinary convalescent home, the figures I am going to efore you will show you that they of some value in restoring the nsical to temporary earning powers. I must remark that such homes or spitals as the Royal National Hospital, Ventnor, and the National atorium, Bournemouth, are included as ordinary convalescent homes in st ent, for their development as open-air sanatoria is of very recent en now the National Sanatorium at Bournemouth closes its doors and August, and I am ignorant underwhose care the patients are this period of the year.

The following table shows that during the four years ending September 30th, 1900, the Charity Organisation Society assisted 5,980 people to various convalescent homes. Of this number, 1,295, or 21·65 per cent., were suffering from some description of chest complaint, and again, 632, or 48·80 per cent., of the latter number were phthisical patients. Of these, 190, or 30·06 per cent., died, or showed no improvement at the time of their return, whilst 132, or 20·88 per cent., were able to resume work on their return, and 265, or 43·41 per cent., were either much improved or benefited from their stay in the homes. It was impossible to classify 28 people, or 4·43 per cent., and of 7, or 1·10 per cent., of the phthisical patients, no record was obtainable.

At the end of each year a certain number of those who had improved immediately after their return were reported as having died or relapsed. (See pages 399 and 400.)

So that, as our report stands, we have 322 people improved or benefited, which is 54·85 per cent. of the phthisical patients, whilst 265, or 45·51 per cent., relapsed or died. To ascertain for how long the improvement lasted, I obtained in June, 1901, reports of 76 of the phthisical patients who were in work, or had improved or benefited from their convalescent treatment in 1898–9. It was found that 15 had left the district in London in which they had formerly lived, and of the remaining 61, 19 had died, 22 had relapsed and were quite unfit for work, whilst 20 were either at work or keeping well. This would show, therefore, that of those phthisical patients who were convalesced during the four years 1896 to 1900, the number sufficiently improved to continue their daily labours would be really much smaller than that given in the table I have furnished, and would not compare favourably with the results that might have been arrived at if our patients had had the benefit of open-air treatment at special sanatoria.

Year.	No. of Patients sent to Convalescent Homes.	No. of Chest Patients.	No. of Phthisical Patients.	Work or Well.				Much Improved.				Benefited.				No Improvement.				Died.				Sex not stated.	No record of Results.
				M.	W.	C.	Total.	M.	W.	C.	Total.	M.	W.	C.	Total.	M.	W.	C.	Total.	M.	W.	C.	Total.		
1896–7 . .	1,768	325	168	27	9	3	39	13	9	1	23	36	17	5	58	19	9	4	32	14	2	—	16	—	—
1897–8 . .	1,484	329	159	21	7	4	32	10	13	5	28	17	9	4	30	15	7	1	23	16	4	2	22	17	7
1898–9 . .	1,463	354	173	18	6	5	29	13	14	6	33	28	13	1	42	21	10	3	34	21	2	1	24	11	—
1899–1900 .	1,265	287	132	18	11	3	32	12	11	3	26	19	16	—	35	14	8	3	25	10	3	1	14	—	—
Total 4 years	5,980	1,295	632	84	33	15	132	48	47	15	110	100	55	10	165	69	34	11	114	61	11	4	76	28	7
		21·65 % of total cases.	10·65 % of total cases 48·80 % of Chest cases.	20·88 % of Phthisical cases.				17·40 % of Phthisical cases.				26·10 % of Phthisical cases.				18·03 % of Phthisical cases.				12·03 % of Phthisical cases.				4·43 % of Phthisical cases.	1·10 % of Phthisical cases.
				64·39 % of Phthisical cases.												30·06 % of Phthisical cases									

RELAPSES OR DEATHS.

Year.	Returned to Work.	Much Improved.	Benefited.	Total.
1896–7	2	2	13	17
1897–8	2	2	23	27
1898–9	2	2	10	14
1899–1900	1	5	11	17
Total	7	11	57	75

But where are these sanatoria? At Ventnor, with its 184 beds, the delay, r procuring a subscriber's letter, and arranging for 10*s.* a week to be paid, d passing the medical referees, is now about twenty weeks before admission can be obtained, and very nearly the same time elapses before a patient be taken into the National Sanatorium, Bournemouth, which has beds. We know that some institutions have been established quite lately, t they are either for special localities, such as the Westmoreland onsumption Sanatorium, or for people who can afford to pay or raise three ineas weekly, such as the London Open-air Sanatorium, at Pinewood, Wokingham.

Miss Jane Walker, M.D., has a very useful little cottage where she takes women and children, but the pressure on its accommodation is very great. The open-air treatment is given at the North London and City of London Hospitals, as part of the hospital cure, but the numbers that can be thus helped is very limited, and although useful, it does not at all solve the vexed question of how to obtain in the quickest possible way proper care for a phthisical patient where there is, in the opinion of his medical adviser, a fair chance of arresting the disease.

In December, 1899, in a short paper which I read before a special meeting of our council, when Sir R. Douglas Powell presided, I said: "District committees are every day dealing with people at their own homes. The most successful assistance is prevention. Possibly through the instrumentality of the society, preventive methods might be pushed very much further, especially if there were a closer relation between the medical men who are dealing with these cases at hospitals and elsewhere and this society. It seems clear that in the earliest stages of the disease a large percentage of cases of cure, or if not of actual cure, of long-continued and perhaps permanent improvement, may be anticipated, if there is careful and continuous treatment; a treatment that is necessarily almost too expensive to be supplied out of the means at the disposal of an artisan. In regard to these cases, satisfactory preventive work might be undertaken. But there may be also other sanitary precautions, the importance of which would not occur to an ordinary visitor. These might be learnt and advocated. And finally, the subject has a close bearing on the much agitated question of the dwellings of the poor. Is it not possible that, attacked from this side, a new policy might be initiated and effectually promoted, not a policy of bricks and mortar, central sites, and municipal buildings,

with all its many attendant difficulties, but a policy for the dispersion and not the concentration of the population, open air, open spaces, and an unadulterated sanitation?"

I still think the conclusions arrived at are sound, but unfortunately we have to deal with a number of sufferers who cannot wait for the good times alluded to, and a large percentage of these people, if their diseases were treated in time, might again become useful wage-earners.

The present difficulties in dealing promptly with the phthisical poor are very great, and may be enumerated as follows: (1) the present want of unanimity among the general medical practitioners as to the advantages to be obtained by the open-air treatment; (2) the difficulty of obtaining admission for the phthisical patient into the special hospitals; (3) the paucity of (*a*) ordinary convalescent homes for consumption and (*b*) special sanatoria; (4) the great expense of these cases, which will greatly tax the powers of the charitable—as probably the greatest chances of recovery will exist in patients who are bread-winners for a family—and not only then will the maintenance money for the phthisical one have to be raised, but enough must be found to assist the wife and children to maintain themselves during a period, probably of several months, whilst the earner is absent.

To remove these obstacles from our path all should join hands. The first difficulty that I have recorded will no doubt pass away to a great extent after the subject has been thoroughly ventilated, as it no doubt will be during this Congress. With regard to the hospitals, the alteration in their methods must be, I think, somewhat radical. First, the "letter" system must be entirely abolished, the nature of the disease and its requirements being the only passport to the wards. Secondly, it is to be hoped that the special hospitals for consumption will soon have country sanatoria, where they will draft patients who, after careful observation and diagnosis, may be found to be sufficiently well to travel, thus giving space for more to be admitted to the wards, who in their turn will be passed on. In this way the great delay which now exists will be obviated. Thirdly, the out-patient department will only be used as a sifting ground, one patient, after careful diagnosis, being admitted to the wards for a time for further observation, so that a more intimate knowledge of his condition may be obtained than would be possible in the department as now constituted; another would be sent direct to a country open-air sanatorium, or to a convalescent home for consumptives; and, as no doubt the hospital will not have a sufficiently large sanatorium to deal with all its out-patients, the physicians should call to their aid general charity. Lastly, the hospital should not treat those patients who should be cared for by the Poor Law, as, if this disease of tuberculosis is to be eradicated, all must bear their fair share in the work. Charity must not be asked to bear the burden that ought rightfully to fall on the ratepayer.

It will be the duty of the guardians of the London poor—and I am glad to say they are fully alive to the fact—to establish sanatoria away from the

dust and turmoil of the city, to which they will be able to send their phthisical patients when the disease is of such a nature as to hold out reasonable hopes of arrest by careful and judicious open-air treatment. Some unions already have separate wards in their infirmaries where the phthisical people may remain when no hope of recovery exists.

The obstacles that I have mentioned would, indeed, be decreased if the hospital authorities and the Poor Law guardians would adopt the methods that I have sketched, but it would still remain a fact that philanthropic effort must be directed, and immediately directed, to the establishment of sanatoria for the poorer classes.

I think a sanatorium should not be too large; a building sufficient to accommodate forty or fifty patients, with the necessary staff and administrative quarters, with at least twenty acres of ground around it, would be best; it should be in a bracing part of England, if possible where land is cheap, so that more might be acquired if found advisable. With regard to the most favourable site and soil I will say nothing, as the subject has been very exhaustively dealt with by experts, but I would wish that sanatoria for the working class should be established on industrial lines, such country pursuits as the tending of goats, the care of flowers, the growing of vegetables, might be undertaken by those patients who were, in the opinion of the resident medical men, able to perform such duties.

Some of the household work might be carried out by the women, and if children were admitted, there might be found female patients willing to amuse and teach them.

I would have the sanatoria not only curative institutions, but training schools in hygienic living for all those that come within their walls. Should it be necessary to admit a greater number of patients than forty or fifty, the extension should be made by the erection of cottages having small rooms, such as working-class people have in their homes, where object lessons in sanitation and hygiene might be given. These cottages should be in electrical communication with the main building.

I take it the first outlay necessary to establish such a sanatorium would be from £10,000 to £15,000.

The weekly cost would be approximately one pound; but the class of people for whom we require these sanatoria are unable to pay such an amount week after week, perhaps for months. Some of the patients having no work and no club could pay nothing, others might pay ten shillings a week. The beds must, therefore, be endowed.

Surely some rich people will come forward, and will no longer allow it to be said that England is behind other nations in helping, not only to do the best that is possible for the phthisical working-class, but to do all in their power to eradicate the scourge of tuberculosis from our midst.

The National Association for the Prevention of Tuberculosis, to which the whole nation should be most grateful, has awakened the interest of the public of this country, and it is fervently to be prayed that this British Congress, which they have so wisely convened, may be the means of arousing enthusiasm

and of promoting further public efforts to fight the disease, which we have now been taught is not one of an hereditary nature to which we must calmly submit, but one that may be tackled and subdued.

In conclusion, I would remind all, rich and poor, great and simple, of the words used by His Majesty the King when, in delivering the inaugural address of the Congress of Hygiene in 1891, speaking on the question of preventable diseases, he asked, "*if preventable, why not prevented?*"

Mr. MORTON (London Hospital for Consumption): The subject of sanatoria has been so fully dealt with that I shall confine my remarks to one or two points which I feel very strongly on. My experience as a hospital secretary, especially connected with the North London Hospital for Consumption, has taught me the necessity for providing a larger number of sanatoria than exist at present, and not only of sanatoria, but of dispensaries. A future speaker will, I see from the programme, deal with that subject. There is another point still which requires to be dealt with; it was admirably brought up by a speaker yesterday—namely, the necessity of providing help for those who are left behind when the bread-winner is taken into a hospital or sanatorium. (Hear, hear.) My experience tells me that an immense amount of misery is left behind by the bread-winner when he enters a hospital. In connection with my institution we have a small fund; it is a very small one, but it has proved to be of great benefit when we are able to make grants from it. No one has any idea of the amount of misery that exists in some poor families in the Metropolis. (Hear, hear.) I have patients come to me with tears in their eyes, saying, "I cannot stay longer, I have a wife and family at home." With regard to the provision of sanatoria themselves, there are at present on my books over 200 people, all passed by the doctors, waiting for admission. That means, as we have only 100 beds in the hospital, that they will have to wait four months before they can be received, and probably in that time a large number of them will die. Somebody said just now that the public need to be educated. They do, but it would astonish you if you knew how much they have been educated through the instrumentality of the Society for the Prevention of Tuberculosis. I have had this year already nearly 4000 applications for information as to the treatment of consumption from all sorts of people. The wealthy need to be educated as well as the poor. (Hear, hear.) A lady came to me some time ago in great distress. Her servant was ill. That servant she wished to get into the hospital. I inquired into the circumstances of the case, and this is the story. She had three servants sleeping in one room, two occupying one bed. One of the servants, whom we will call "A," got consumption. Out of kindness of heart, the lady called in her family doctor. That gentleman treated the patient in the house here in question, and the mistress was good enough to keep her on, but when she got very ill she sent her away. Shortly afterwards a second servant, whom we will call "B," got consumption. She in her turn was treated by the same doctor, and another servant was got to replace "A." She slept in the same bed with "B." No wonder the servant got consump-

tion. The lady came to me to know whether we could take her into the hospital. Gentlemen, I maintain that, in the face of facts like that, the wealthy need education as well as the poor. (Cheers.) Here was a lady, an educated woman, who had never heard before that consumption was infectious. She asked me the question, "Is consumption infectious?" and when I told her that undoubtedly it was, and referred her to what already had happened in her household, with tears in her eyes she said that she would make other arrangements for her servants. At any rate, the third servant that came into our hospital was sent away much improved, and, I hope, cured. There is one other point which I should like to mention, and that is the necessity for homes for those that are incurable. There exist in London, as far as I know, two small homes, or possibly three, one in the north and one in the south of London. In the one about which I know most I find that during the last five years they have taken in on an average seventy patients dying from consumption. When one comes to reflect upon it that those seventy people, had there been no home of that sort, would possibly have been spreading the contagion in all directions, one cannot help being struck with the necessity for some homes of this description. We want not only sanatoria, but homes for the dying; we want not only homes for the dying, but funds from which we can help those who are left behind. (Cheers.)

SANATORIA FROM THE POINT OF VIEW OF COUNTY COUNCILS.

By Dr. KAYE,

County Medical Officer of Health, West Riding of Yorkshire.

The West Riding County Council has on several occasions considered the provision of sanatoria. It was pointed out that public recognition of the preventability and fatality of tuberculosis, justly termed "the white man's plague," has stirred up active consideration of the solution or remedy; that preventable disease not prevented is a crime against the community; that Pasteur himself has said, "It is in the power of man to eradicate parasitic disease."

To Koch we are indebted for indicating in a scientific manner the target of treatment, and to-day we are justified in saying that the problem of prevention has now emerged from debatable ground, as well as that the whole class of germ diseases has been lifted out of the region of the intangible and mysterious into the domain of the comprehensible and definite. Given a tendency which may come by inheritance, plus the admission of the germ, then the disease will likely follow; given a same tendency but the prevention of the admission of the tubercle bacillus, then the person will escape. In the

light of such experience we are now more fully cognisant of our powers over the disease, and we can no longer remain inactive consistently with our convictions. To prevent the spread of tuberculosis then, two objects must be accomplished: (1) The destruction of the infection given off by the sick (which in this case is principally in the sputum). (2) The prevention of the escaped poison from coming in contact with susceptible persons.

The West Riding County Council know that this is theoretically easy, but that practically there are difficulties because of the lack of co-operation and of the indifference of many. In order that preventive work may be effectual we must have the co-operation of the healthy as well as those for whom the labour is bestowed, and to forward this object lectures and the distribution of literature have been undertaken by the County Council.

Figures will no doubt be given elsewhere during this Congress of the enormous sacrifice of human life ascribed to tuberculosis. In the West Riding Administrative County it may be said in round numbers that 2,000 persons die every year from consumption of the lungs. No class of society is secure from its ravages, and no period of life is held sacred, although, sadly enough, most of the victims fall between the ages of twenty-five and thirty.

It may be advisable to rehearse very briefly some of the possible objections to sanatoria which came under criticism.

1. Treatment by open air may be called a new fad. This objection is too late. It was on the Continent in the fifties that the treatment actually came into practice, and has since become so general in Germany, Switzerland, Austria, America, Australia, and Africa. There are now over a dozen well-known establishments in this country, besides the experience in our barracks and prisons, each of which can furnish abundant evidence in justification of the treatment.

It may be interesting to here point to the marvellous diminution in the prevalence of consumption in what was once known as the Kingdom of Naples in Italy. A Neapolitan decree was issued as early as 1782 A.D., containing several drastic propositions, all framed solely against tuberculosis. Besides notification, disinfection, burning, etc., there was compulsory removal of the sick poor to hospital. Instead of a death rate as then of ten per thousand living, it is now less than two, even though Italy has become the resort of consumptives.

2. Plea of humanity. Why increase the sufferer's trouble by removal? Why emphasise his sad condition? Objectors forget sanatoria are meant for curables. What can be more inhuman than consigning an intelligent being with long illness to the care of those whom he loves, when that care probably means illness and death to some of them, besides curtailing the sufferer's chances and leaving him in despair.

3. Tuberculosis cannot be placed in the same category as, say, scarlet fever, which is a typical infectious disease. True, but it yearly kills more people than all the acute specific diseases combined; and, moreover, the

average home contains greater facilities for the isolation of a fever patient during a few weeks than for the proper treatment of a phthisical person during the prolonged course of the disease.

4. The unwillingness of patients to undergo treatment. This would be a smaller factor here than in any other disease, for the treatment is so simple, cheerful and hopeful that no one would prefer to debar themselves from it. At present, unfortunately, only the rich can attain it.

5. Curative results are limited, and are not such as to warrant the expenditure of money in that direction. However limited they may be at present, it cannot be denied that each attempt at treatment reduces the amount of infective material at large, and so directly makes for the future subsidence of the disease.

6. Sterilise the sputum and the patient is harmless. Such opponents forget that one great object of sanatorium treatment is to restore the patient as soon as possible to the wage-earning portion of society.

7. Money would be better spent by improving the sanitary conditions of the districts, and in the reduction of remediable causes. No better and cheaper object-lesson as to the value of sanitation could be erected than a local consumptive sanatorium.

8. It would be better to provide convalescent homes, etc., in which to fortify the weak against the disease. Obviously it is best to strike at the root of the evil, namely, the tubercle bacillus, which unfortunately does not attack the weak alone.

9. Concentration of the infection is dangerous to the neighbourhood and to the patients themselves. This is simply a question of administration, though a limit of 200 patients has been advocated.

There are several other arguments, but only indirectly affecting sanatoria, and which time prevents me from dealing with now, *e.g.*, ignorance of the onset of the disease. Help is being afforded by the establishment of properly equipped bacteriological laboratories, as in the West Riding, and in which all work is done gratuitously.

It has been supposed that only special parts of the world, favoured as to climate and altitude, were suitable for the treatment of consumptives. Doubtless some climates are more favourable than others, and the Davos, the Riviera, and Egypt may have some advantages over England and Germany, but statistics gathered from sanatoria in both the latter countries show results as successful; and with this advantage, that they occur in the country where the patient will afterwards spend his existence.

The provision of a sanatorium for the treatment of phthisical patients embraces several ideas, viz., recovery, isolation, education.

1. *Recovery.*—Tuberculosis is always derived from pre-existing cases by the introduction of the bacillus, but in the genesis of many cases the infection has been enabled to take effect by the pre-existence of bad hygienic conditions which have prepared the tissues of the victims for the growth of the organism. The sanatorium treatment is eminently hygienic, with pure air as an essential, supported by liberal diet, and with regulated exercise and rest, under personal

medical supervision. It is a treatment at the same time easy, attractive, and cheerful, and meets the view of Voltaire, who said that "the hope of recovery is already half the recovery." Statistics taken from the reports of many establishments show that about one-third are cured and one-third improved; but the treatment has so progressed in recent years that we are justified in expecting even greater results in the way of cures.

2. *Isolation.*—However limited may be the scope of the sanatorium, it cannot fail to exert a relatively powerful influence on the death-rate of the future. For it is obvious that the treatment of a single patient in such an institution implies the removal of a definite focus of the disease from the midst of the community. Yet we must be careful not to give to the word "isolation" the sense which makes it so repugnant to the sufferer and his friends. In this case it does not imply that the patient is debarred from all social intercourse. It simply means that he is transferred for a time to bright, cheerful and invigorating surroundings which are favourable for his own improvement and development, but unfavourable to the persistence of the germ mischief.

3. *Education.*—Besides the immediate benefit to the patient and to the public, there is the gradual demonstration that consumption is preventable and curable, not in some far-off land and by some impracticable process, but in our very midst. When people realise the rational principles of this treatment, and the supreme value of fresh air and proper environments, the idea will extend to other diseases. If pure air is shown to be so valuable in disease, the people will soon recognise its value for the maintenance of health, and having acknowledged its necessity for the individual they may realise its importance to the multitude. It is far preferable to induce the people to choose fresh air and cleanliness for their own sakes and others than to resort to restrictive legislation.

It is a truism that public intelligence sets the pace at which progress can advance. Therefore the duty of local authorities is to stimulate and to utilise public interest, to lead the people, to show them what they want and how to get it. The layman understanding about the germ as being a disease-producer is more likely to be a willing coadjutant in measures for the restriction of the disease. In relation to his fellow men, Carlyle, in his "Past and Present," has grimly commented upon the interdependence and relationship between all classes in describing the widow who, begging alms, infected a whole household.

From the foregoing remarks it may be gathered that the measures to prevent and minimise the ravages of this disease rest to some extent with the healthy individual, who can be more careful in the choice of a dwelling-house, in the sterilisation of his food, and in many other ways. The infected patient, also, who has no facilities for proper isolation, may exercise the greatest care in the disposal of the phlegm and in his association with healthy friends.

Local authorities have numerous powers, and many of these authorities have not been unmindful of their responsibility. Dwellings, workshops,

factories have been improved, insanitary areas obliterated and made habitable, overcrowding has been prevented, free disinfection of houses and clothing has been undertaken, directions as to the prevention and restriction of the disease circulated, and lectures easily understandable have been delivered in many places. The result of this is to be found in the fact that during forty years consumption has been reduced nearly 50 per cent., whilst leprosy, cholera, typhus, etc., have been banished from our midst.

But just as there is a limit to individual effort, so it is not at present practicable for the numerous local authorities to separately and directly cope with the source of this terrible scourge by providing means for the isolation of the infected. The question which I wish to put forward for consideration at this juncture is, Is it desirable and practicable by combined action to make an attempt at the isolation and cure of the sufferers in the county, and by so doing to effectively prevent the spread of the disease to those who are as yet uninfected?

It will be conceded without dispute that the greater the area of protection the more favourable the result. Uniformity of purpose and concert of action are necessary; thoroughness of action in one district may be rendered abortive by negligence in another. Organised systematic methods are absolutely essential to any satisfactory results in the restriction of tuberculosis.

An analysis of these arguments will show the absolute necessity of isolation. This can be best carried out in sanatoria, and the question immediately arises as to how funds for the necessary expenditure can be provided.

(1) *Private Enterprise* has already given us several good institutions, but they are by no means adequate to the demands of the country, neither are they within the reach of the working classes.

(2) *Philanthropy.*—Much as has been done in this country in the munificent establishment of general hospitals, etc., it does not seem to me that the solution of the difficulty will be met in this way for obvious reasons.

(3) *State or Public Provision.*—In tuberculosis we have a common enemy which demands a united defence in which each man plays his part. I do not suggest by any means that the public purse should be forthwith taxed with the care of each consumptive patient in the land, but I feel strongly that means might be provided for many such persons to "help themselves" back to health, while at the same time they contribute to the safety of the community. On the Continent and in America many of the institutions are provided by State, while in England I believe that contributions to such establishments have been made by county councils. Boards of guardians, also, can now get permission to erect or contribute to consumptive sanatoria.

I do not know how far it may be at present legally possible, but the proposal may at all events be made that county councils should provide suitable institutions, and that a small fixed charge for maintenance should be made against each sanitary authority sending a patient. This need not necessarily come out of the local rates if the sanitary authority were empowered to obtain it from the patient or by local effort.

The following scheme has been suggested to the West Riding of Yorkshire by the County Council as a beginning of what, it is to be hoped, may ultimately become more general:—

Suggested Consumptive Sanatorium in the West Riding Administrative County.

Rough calculations as to probable cost.

1. Initial Establishment Cost for 50 Beds—

	£	s.	d.
Site, say 40 acres at £120 per acre	4,800	0	0
Buildings, say at £300 per bed	15,000	0	0
Furnishings, say £25 per bed	1,250	0	0
	£21,050	0	0

2. Annual Expenditure—

				Approximately £	s.	d.
Interest and Repayment of Loan of £16,250 for Buildings, etc., borrowed at 3 per cent. for 30 years				830	0	0
Ditto for Loan of £4,800 for Site, borrowed at 3 per cent. for 50 years				187	0	0
Salaries—						
Bonus to 2 Local Physicians at £50	£100	0	0			
Matron and Secretary	60	0	0			
Cook	35	0	0			
Servants, six at £25	150	0	0			
Nurses, four at £30	120	0	0			
Gardener at £45	45	0	0			
Porter at £45	45	0	0			
				555	0	0
Food, 50 Patients and 14 Staff at 15*s.* per week				2,496	0	0
Washing, ,, ,, at £3 per year each				192	0	0
Coals, Gas, Wine, Drugs, etc. (2*s.* 6*d.* per head weekly)				416	0	0
Rates, Taxes, etc. (say 5*d.* per head per week)				70	0	0
Repairs, Renewals, and Sundries				200	0	0
Total Annual Expenditure				*£4,946	0	0

* This represents a cost of 38*s.* per patient per week.

ANATORIUM TREATMENT OF PHTHISIS AMONG THE POOR.

By Dr. JANE H. WALKER.

o not intend, in making these few remarks, to lay down any definite or atorial statements with regard to the methods to be pursued in dealing h the consumptive poor. I would only point out a few of the difficulties ch lie in the way of treating phthisis among the poor, and would bring to r notice the efforts towards coping with the disease which are being made at present in this country.

On one point I take it we shall all be agreed, viz., that, important as it is to make every effort to fight the disease among the rich and well to do, it is far more important to prevent and try to cure consumption among the poor, for it is in the poorer classes that the disease works its greatest ravages, and it is the poor we should seek to aid; the rich may be depended upon to seek our help for themselves.

I need hardly draw attention to the fact that consumption and overcrowding bear a definite relation to each other; this relationship is now recognised universally, and has even been cited, in one of our Midland towns, as a reason for neglecting the practical treatment of phthisis by the sanatorium method in favour of the Utopian treatment by perfect sanitation. Until sanitation is perfected, until we can point to no overcrowded areas in our towns, no overcrowded, unhealthy cottages in our rural districts, we must bear in mind the two facts that consumptives have little chance of being cured when their daily lives and daily occupations are carried on under conditions of overcrowding and poverty, and that healthy persons run a distinct risk if the contact between themselves and the phthisis sufferers be close and prolonged. If in a crowded dwelling or workshop, those already affected are to be cured, and if the disease be not spread to those uninfected, it is a necessity that the consumptive patient should be removed at as early a date as possible. It must be remembered that, as a rule, where we have overcrowding, there we have also the concomitants of overcrowding, poverty, with underfeeding as a necessary consequence, dirt, absence of fresh air and sunlight, and all these add their contributions to the causation and extension of the disease.

In dealing with phthisis, as in dealing with any other disease, we have to consider the methods of prevention and cure. Doctor Greenhough has laid down the law that, "In proportion as the male and female populations are severally attracted to indoor branches of industry, in such proportions, other things being equal, their respective death rates from phthisis are increased;" and, therefore, as we see our rural populations being diverted year by year more from the country to the large towns, it is obvious that, if the present

diminution in the death rate from phthisis is to be maintained, we must enforce adequate inspection of factories and workrooms, and practical methods of abating overcrowding. It is no solution of the difficulty to pull down our "mean streets" and build in their places larger, cleaner houses for the better classes, contenting ourselves with providing for the dispossessed tenants a few blocks of model dwellings, models too often of all that should not be, cramming a whole streetful of human beings into one huge block of buildings, facing round an airless, sunless court.

We cannot as yet in this country point to anything like the systematic provision for poor consumptives provided in Germany, nor to the State-aided sanatoria springing up everywhere in America, but our local authorities are beginning to awaken to the importance of removing their poor phthisical patients from their home surroundings and from the common wards of infirmaries to sanatoria built specially for the treatment of consumption. But though much is being done, there remains very much to do. Our authorities, like science, "move but slowly, slowly, moving on from point to point," and we cannot but feel that what is wanted, especially in a large city like this, is concerted action. It is a very great thing for a borough like Kensington to build special wards for its phthisical paupers, but what is wanted is, not special accommodation in this close stuffy town, but sanatoria for each division of the town built in the country, where patients can have not only open, but fresh air, and where they can stay, not for a certain term of weeks, or even months, but regardless of set rules, until they are fit to carry on their ordinary work again.

My attention was first drawn to the open-air treatment of consumption in 1892, and I then determined to give the method as fair a trial as my powers permitted. I took a small farmhouse at Downham in Norfolk, and though I had many difficulties to contend with at that time, and though the patients were of quite the hospital class, and many could not afford to stay a sufficiently long time to give themselves a fair chance, yet the plan went on and flourished. In all I had thirty-five patients under my charge at Downham. Of these seventeen recovered, and were, when I last heard of them, at work and well; two improved, seven were lost sight of, eight died subsequently, one died in the sanatorium. In February, 1900, I moved the sanatorium to Clare in Suffolk, where I took a cottage which I adapted to carry out the treatment. Here we can take in ten women patients. The house is looked after by a matron and probationer, and a resident medical officer lives in the village.

This place was started as an experiment, to see if it were possible to make an establishment within the means of the poor self-supporting, and the results have been very satisfactory. Setting aside the initial expenses of starting the house, a sanatorium for ten patients, each paying fifteen shillings a week, if no cases requiring special nursing be taken, can be made to just pay its way; an establishment on the same lines for thirty or more patients might be made to pay 2½ per cent. on the primary outlay.

Since the cottage at Clare was opened I have had 56 patients. Average age, 22 years; average length of stay, 4½ months. Average gain in weight

one. Extent of disease, one lung, 36; both lungs, 20. Complications: influenza, 5; pleurisy with effusion, 2; pneumonia, 2; bronchitis, 2; pneumothorax, 1; asthma, 1; laparotomy, 1; abscess of glands, 1; confinement, 1; hemiplegia and chorea, 1. Result: comparative cure, 19; quiescence, 16; amelioration, 7; non-amelioration or death, 4; still under treatment, 10.

I have found that a poor patients' sanatorium on a small scale is in many ways difficult to manage, especially if men patients are taken in as well as women. The patients are in many cases not really invalids, they cannot be kept permanently in bed, and the amount of control which can be maintained them while they are out and about is small. The work which can be out of them is very variable and slight in amount; one week six or seven be fit for work, the next only one or two can do anything. Many men of class that have been sent to me regard house-work as beneath them, and out a man over them with a tight hand little or no work is done. For these and other reasons I have been obliged to give up taking in men patients Clare, though I have had a few slight cases boarded out in village homes, and have had very encouraging results with these patients.

Finally, let me point out that the work of treating the consumptive poor is a very encouraging one. The poor suffer, not only from phthisis, but from want of food, fresh air, and nursing, As a rule, their only treatment has been the familiar bottle of medicine supplied from a dispensary; they respond quickly to the changed conditions of life offered by sanatorium treatment; they are, I have found, sincerely anxious to aid every effort made on their behalf. The chief difficulties, the great discouragements met with are, firstly, those of finance; secondly, those of providing patients with some form of healthy employment, by which they may earn something for themselves when they are fit for work, and yet not fit to return to their former heavy and often unhealthy occupations.

The need of an After-Care Association to provide such work, the need of some fund specially for the relief of poor consumptives, grow in proportion as the sanatorium treatment of consumption becomes more accessible. Our private philanthropy should be in co-operation with public bodies, such as Poor Law Guardians and County Councils, such a co-operation as forms the basis of our Charity Organisation Society, for I believe that, though private philanthropy may rightly be expected to do much, what is needed is such an association, such a fund for each town, or subdivision of a large town, on organised and systematised lines.

Sir JAMES CRICHTON-BROWNE, F.R.S.: Mr. President and Gentlemen,—I think it is desirable, in order to give a practical turn to the discussion which is to follow, that a Resolution should be submitted to you. In doing that, I would venture to say that I think we are deeply indebted to our American and our German friends for the trouble they have taken, and for the expense they have gone to, in bringing vividly and graphically before us their results. These results are, I think, very convincing. What you have heard to-day from them and from the others who have read Papers must,

I think, have satisfied you that an extension of the sanatoria treatment of consumption is eminently desirable, not only in its preventive but its curative aspects. I therefore beg to submit to you the following Resolution:—"That the provision of sanatoria is an indispensable part of the measures necessary for the diminution of tuberculosis, and that the duty of providing sanatoria should devolve upon county councils and county boroughs, and that those bodies should be empowered to make such provisions."

Dr. KAYE: I have much pleasure in seconding the Resolution, after the able and excellent address to which we have listened. In Yorkshire, where we are exceedingly anxious to provide sanatoria, we are simply hindered by want of legislative power. I therefore have much pleasure in seconding the Resolution.

Dr. PEEL RITCHIE: I should also like to propose a Resolution, which is not at variance with that of Sir James Crichton-Browne's. It is: "That it is desirable, for strengthening the hands of the members of parish councils and others interested in the treatment and care of those on the parochial roll suffering from pulmonary phthisis, that an expression of opinion be given by the Congress to this effect—that it is not only right but necessary that proper provision should be made for the housing and accommodation of such afflicted persons, either by separate wards being provided in the poor or workhouse hospital in which they may be treated apart from the other inmates; or, what is more advisable, that a distinct building or sanatorium be erected at a moderate cost, with accommodation for the care and treatment of cases of both sexes, not only in the early or curable, but also in the advanced stages of the disease." We have already a large number of phthisical patients on our poor roll, and in certain parish councils we are not all united as to the necessity of providing proper isolated accommodation for them. I therefore ask the Congress to strengthen the hands of parish councils, who are already dealing with these cases, by expressing an opinion upon the point which I have submitted to you.

Dr. SCURFIELD: I believe that county boroughs already have the power, not only to provide sanatoria, but to subscribe to sanatoria and make contracts for using portions of them. I do not know whether you want to alter the Resolution for that reason. One of the sections of the Public Health Act gives power to county councils to provide hospitals for the sick, not the infectious sick, but the sick of all kinds. My reason for mentioning this is that the county borough for which I am Medical Officer of Health does subscribe to a sanatorium for consumption, and does so on the advice of their town clerk. They subscribe £120 a year to keep two beds for their own use in the sanatorium of the county of Durham.

Sir JAMES CRICHTON-BROWNE: I think there would be no objection to withdrawing the second clause of my Resolution; in fact, I should rather

prefer to do so, because it refers to the county councils. We want only a very general expression of opinion from this meeting that an extension of the system is desirable. Dr. Wetherley asks me to mention that they have instituted a new system in his county, by getting groups of working men employed in factories or workshops to combine and subscribe a penny a week each, and upon doing that in certain numbers they become entitled to claim for the use of a bed in the sanatorium.

The PRESIDENT: I think Dr. Ritchie's motion must be dealt with as a separate resolution, especially in view of the description of Sir James Crichton-Browne's motion. I will therefore put the Resolution: "That the provision of sanatoria is an indispensable part of the measures necessary for the diminution of tuberculosis."

The Resolution was put, and carried unanimously.

Mr. W. F. ROBINSON: I rise to second Mr. Peel Ritchie's resolution. As a member of the Birmingham Board of Guardians, I think it is desirable that parish councils and boards of guardians should have strongly urged upon them the desirability of establishing sanatoria for poor patients.

The PRESIDENT: I may point out that Dr. Ritchie's motion has nothing to do with boards of guardians; it refers only to parish councils.

Dr. RITCHIE: I come from Scotland, and I used the words "parish councils" because they represent what we have in Scotland. I suppose in England the board of guardians is very much synonymous?

A DELEGATE: I could not hear whether district councils were included in the Resolution; district councils certainly ought to be added.

The PRESIDENT: I must point out that we must be careful about the terms of the Resolution. However much we may be in sympathy with them, if we pass a resolution in favour of placing powers in the hands of parish councils, so far as I can see it does not apply equally to the whole of the United Kingdom, and it may be attended with inconvenience and some confusion. I venture to think that the terms of this Resolution have not been quite carefully adapted to the question at issue.

Councillor CLARKE (Edinburgh): As Chairman of the Parish Council of Edinburgh, of which Dr. Ritchie is also a member, I can see no harm in this Resolution being put to the meeting. I think it will be a means of strengthening the hands of parish councils in dealing with phthisical poor. It is only a recommendation. There is no doubt that the parish councils have power to do this and charge the rates, and this would simply come as a recommendation to strengthen their hands in dealing with the segregation of these patients.

Dr. COOPER PATTIN (Norwich): I should like to move an amendment to the Resolution, to the effect that we express the desirability of all public authorities contributing to this work. That, I think, will meet every conceivable objection, and will also enable those public authorities that have special machinery adaptable to the purpose to make use of it.

Dr. WEATHERLEY: That is a very excellent amendment, and covers all the ground. I shall have much pleasure in seconding it.

The PRESIDENT: You said "all public authorities." These are very general terms.

Dr. COOPER PATTIN: My amendment is to substitute the words "public authorities" for the specific bodies mentioned by the mover of the Resolution.

Dr. RITCHIE (Edinburgh): If the amendment gives power to provide for the poor who are already on our roll, I am perfectly willing to accept the amendment just proposed.

Dr. BERNARD O'CONNOR (London): I propose as another amendment the substitution of the words "local sanitary authority" for the words "parish councils."

Dr. HODGSON (Cheshire): I beg to second that, for the simple reason that a difference must be made between England and Scotland. In England parish councils have not the power to contribute a single farthing for any such purpose. In Scotland I understand that is not the case. But local sanitary authorities have some power, and therefore I second the amendment.

The PRESIDENT: There is a difficulty owing to the difference of authority between English and Scottish parish councils.

Dr. VINRACE (London): Might I ask whether it is not desirable to have two different Resolutions, one to apply to England and the other to apply to Scotland.

The PRESIDENT: If I am asked that question I am not prepared to deny it, but it is also desirable that gentlemen who wish to propose Resolutions should come with them already prepared, and not bring them upon the spur of the moment. It is not any part of the Chairman's duty to enter into an argument, but I must beg the Section to be guarded in the Resolutions to which they come. For instance, Dr. Cooper Pattin proposes his amendment, which stands before the amendment which came from the other side of the hall in favour of substituting "all public authorities" for "parish councils." What is proposed in that term—police authorities and road authorities? I think we are going rather far. However, it is my duty to submit the Resolution. The original Resolution has been read to the meeting,

which two amendments have been moved, one to delete "parish cils" and insert "local sanitary authorities," and the other to omit ı councils" and insert "all public bodies." The question is, whether ords "parish councils" be omitted in order to insert "local sanitary orities."

The amendment was put and carried.

Dr. RAMSEY: Do I understand that the county councils were deleted from James Crichton-Browne's Resolution?

The PRESIDENT: No authority was mentioned.

Dr. RAMSEY: From experience I think the county council is the best authority to effectively work a sanatorium. If you leave the matter in the hands of a large number of authorities with small rateable values, there will be con- lerable difficulty in working the sanatoria. The county council can erect a ıatorium, and can levy a rate on the small districts, and for that rate they ıave the right to send patients to the sanatoria. Therefore I think the larger body is the best body for working sanatoria. I would suggest that "county councils" be put in the Resolution instead of "sanitary authority."

Dr. SCURFIELD (Sunderland): I would like to point out that there are two entirely different conditions—one is the provision of sanatoria for the cure of patients, the other the provision of homes for incurables. The home for the incurables must be in close proximity to the place where the people are taken from, and might be provided by the erection of another pavilion to the already existing infectious hospital of the town or district. That is quite a different question from the one of providing sanatoria for the cure of cases, where you have to carefully choose a site and get a pure air, and probably go to a considerable distance from the town from which you draw your patients. The two questions seem to me two entirely different ones, and they might probably have to be dealt with by different bodies. It might be a good plan for the county council to have charge of the sanatoria for the curables, whereas it would be a good plan for the board of guardians or the urban district council to have charge of the home.

The PRESIDENT: The question is that the Resolution in its amended form, with the substitution of the words "local sanitary authorities" for "parish councils," be adopted.

The Resolution was put and lost.

Dr. VINRACE (London): Shall I be in order in putting an amendment?

The PRESIDENT: You cannot put an amendment, because the Resolution has been lost.

Dr. VINRACE: Might I frame a new resolution?

The PRESIDENT: Certainly.

Dr. VINRACE: I beg to move—"That in the opinion of this Section, in England rural sanitary authorities and boards of guardians, and in Scotland parish councils, should have power to provide sanatoria and homes for incurables."

The PRESIDENT: I must rule that that resolution is not in order, because it is so closely akin to the one which has just been negatived.

THE INCIDENCE OF PHTHISIS PULMONALIS IN THE HALIFAX POOR LAW UNION, WITH SOME REMARKS ON SANATORIA.

BY THOMAS M. DOLAN, M.D., F.R.C.S. (Edin.).

Drawings by Messrs. WALSH & NICHOLAS, *Halifax.*

A VERY important conference of Poor Law Guardians from Leeds, Bradford, Huddersfield, Dewsbury, Todmorden, North Bierley, and Halifax, was held on May 12th, 1899, at the board-room of the Halifax Guardians, to discuss the question of "Hospital Treatment for Consumptive Patients." The chairman, Alderman Josiah Wade, emphasised the position when he said: "that if anything could be done to eradicate this dreadful disease the guardians of the poor were most anxious to do it for the benefit of the bread-winners."

I mention this conference to show how very early in the movement initiated by the National Society for the Prevention of Tuberculosis the guardians of the poor in our northern districts appreciated their responsibilities, and how anxious they were to fall into line with the great movement which is now extending over all civilised countries, and which is already bearing good fruit. I had the pleasure of addressing the united boards at some length on the general subject of consumption, of explaining modern views as to its causation, prognosis, and treatment, necessarily including modern sanatoria; but I do not desire to dwell on my own personal part in the conference, but rather to refer to the views expressed by some of the guardians present, and to more thoroughly emphasise the position taken up in the North.

Mr. Guy (Bradford), who had visited several institutions, said that "the treatment of phthisis in their workhouse hospitals had been altogether wrong, and he hoped that boards of guardians would join in the crusade in the interests of the working classes, who were reduced to distress and misery, and whose families were impoverished by the long-continued drain on their

resources by this exhausting disease." Dr. McCandlish (Leeds) advocated the open-air treatment, and also spoke of the duty of sanitary authorities to orkers, and hoped that something would be done, and done quickly. ro adford) hoped that in twenty-five years' time, by a system of care, they would have exterminated the disease altogether. At se of nteresting discussion the following resolution was passed :—

> "That the inmates of workhouses suffering from phthisis should be treated elsewhere than in workhouse infirmaries, and this conference suggests that the boards of guardians represented should earnestly consider the question, with a view to such combination or otherwise for the provision of isolated hospitals for the treatment of phthisis as the boards may hereafter agree upon."

The adoption of the principle of this resolution marks a very important stage, only the initial one, but still so far satisfactory. We move slowly perhaps in the North, but we move surely. If no great result has followed from this expression of opinion in the erection of sanatoria, yet the seed has been sown, and ventilation of the subject has taken place. We have moved slowly, because practical members of boards of guardians have asked many questions:

1. As to the number of consumptive patients in our northern districts.
2. What provision should be made for them, and how?
3. Should sanatoria be built by each authority separately, or by combined authorities?
4. Whose duty is it to provide sanatoria?
5. The probable cost per head in sanatoria.
6. Yearly expenditure, and other questions of finance.
7. How long should patients be detained in these sanatoria?
8. What is to become of the incurable cases?

This contribution may serve as a peg to hang some thoughts upon relative to the various points mentioned above, and, still better, may draw forth the opinions of others on this question.

a. The incidence of phthisis in the Halifax Poor Law Union may serve as a guide as to what might be required in the way of hospital accommodation in this union as it is presented to us in our statistics of the past. I take the last ten years' experience of the number of patients we have had under treatment in St. Luke's Hospital, which is the poor law union infirmary for this district. The Halifax Poor Law Union covers an area of 52,605 acres, with a population of 185,119, rateable value of £877,465, £44,609 only being derived from agricultural land. The geology of the district is largely carboniferous, the bulk of the population being engaged in manufactures, wool forming the staple product—though we have other industries, as silk, cotton, iron, leather, whilst there are small farms on which agricultural labourers are employed. I take a period of ten years to show the mortality

in the union hospital, and I also give the mortality in the Halifax borough to show the contrast during the same period of years.

	Admissions.	Deaths. Phthisis Pulmonalis.	Deaths. Phthisis Laryngeal.
1891	13	8	—
1892	22	6	1
1893	23	12	4
1894	31	24	1
1895	36	13	2
1896	38	—	1
1897	18	24	—
1898	32	23	4
1899	19	24	1
1900	17	15	—
Total	249	149	14

The total admissions during the ten years amount to 249, only thirty-one of which were women, and the deaths for the ten years to 163.

The number of deaths indicate clearly that the hospital has been used not alone for curative purposes, but for those who have abandoned all hope, and who simply came in to die, after all other means of subsistence had been exhausted.

I give in another column the number of deaths in the borough of Halifax during the same period.

Deaths from Phthisis or Pulmonary Consumption from 1891 *to* 1900.

Years.	Deaths.
1891	168
1892	134
1893	135
1894	141
1895	185
1896	161
1897	124
1898	139
1899	138
1900	152
Total	1,457
Average Total	145·7.

When we contrast the number of deaths in the borough, viz., 1,457, with the deaths in the union infirmary, viz., 163, it will be seen that the guardians are only touching the very fringe of the disease as it exists in the Halifax district.

This practical question has to be faced. In Halifax borough, with an average annual death-rate of 145, whose duty is it to move? If we multiply the 145 by 3 we may be able to arrive at an approximate estimate on the total cases of consumption in the borough of Halifax, viz., 435.

2. We have next to consider—no matter whose duty it is—what would be the cost of providing a sanatorium for twenty patients, about the average

under treatment in the Halifax Union Infirmary, and I have asked Messrs. Walsh & Nicholas, architects, to draw a detailed plan of a sanatorium suited to our northern climate, and I give you the results, estimated cost of the same, and plans. The proposed sanatorium would possess certain conditions desirable in the nature of subsoil, situation, protection from winds, foliage, water supply, accessibility by rail and road.

Description of Consumptive Sanatorium.

For twenty patients the site would not be less than ten acres in area, preferably in an elevated though not exposed situation, and with a slight fall from north to south. The subsoil should be of a dry and sandy nature.

The accompanying plans are designed especially for the exposed situation and the severe climate of the West Riding. It will be seen that the pavilions are arranged in such form and position that each ward is open to the sunshine the whole day, and the verandahs offer protection from the strong winds, and have hinged screens across them at intervals.

Each pavilion or ward block is connected with the administrative block by a covered way, which, in case of extensions, might be continued east and west, and connected with additional pavilions.

The laundry block, which includes disinfector and well-lighted drying closets, is situated behind the administrative block, and detached therefrom.

The mortuary would be quite detached and screened from general view.

The administrative block provides accommodation for a resident matron, visiting doctor, eight nurses, also servants and man-servant. The night and day nurses' bedrooms are entirely apart.

The general construction and sanitary fittings of the buildings would be on similar lines to those now adopted in the case of "notifiable diseases."

Estimate of Cost of a Sanatorium for 20 Beds.

	£	s.	d.
Administrative block	2,300	0	0
Two pavilions of two 5-bed wards each . . .	3,170	0	0
Laundry block and mortuary	530	0	0
	£6,000	0	0

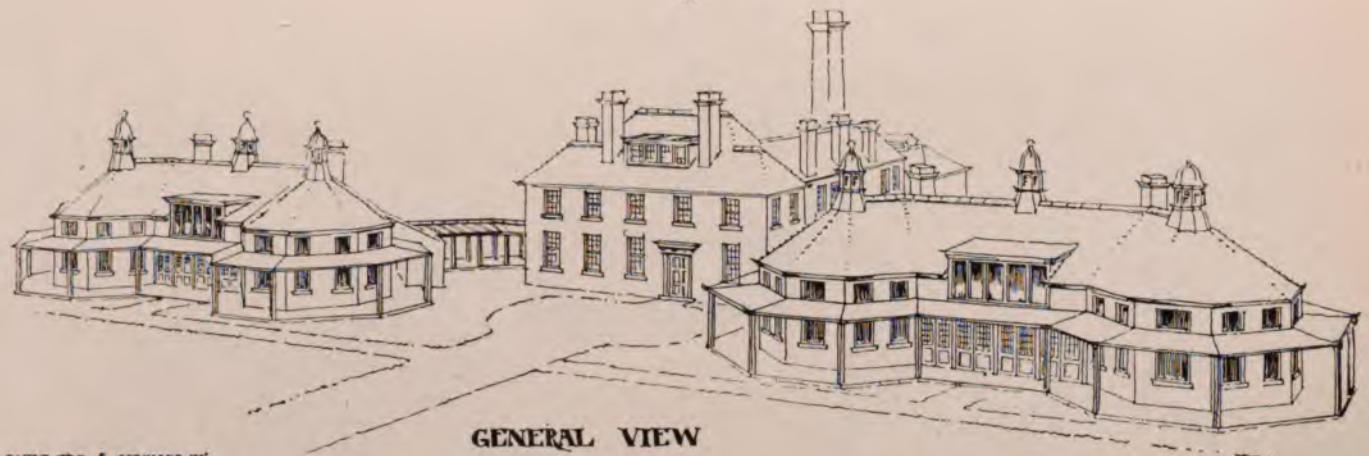
Equals £300 per bed.

The plans show only five beds in each ward, and a separate duty room for each. This, no doubt, is an ideal arrangement; but, where necessary, each of these wards might be increased in length to ten beds each, as shown by the dotted lines on block plan, which would reduce the average cost per head from £300 to £250, no increase of the administrative block being necessary.

Or, as an alternative, a pavilion of two wards of ten beds each, and one of five beds each, could be built, and the cost proportionately reduced to £200 per head.

The administrative and laundry blocks only might be permanent buildings, and the pavilions built of lighter temporary construction, and burnt down

I.



GENERAL VIEW

WALSH & NICHOLAS
ARCHITECTS
HALIFAX

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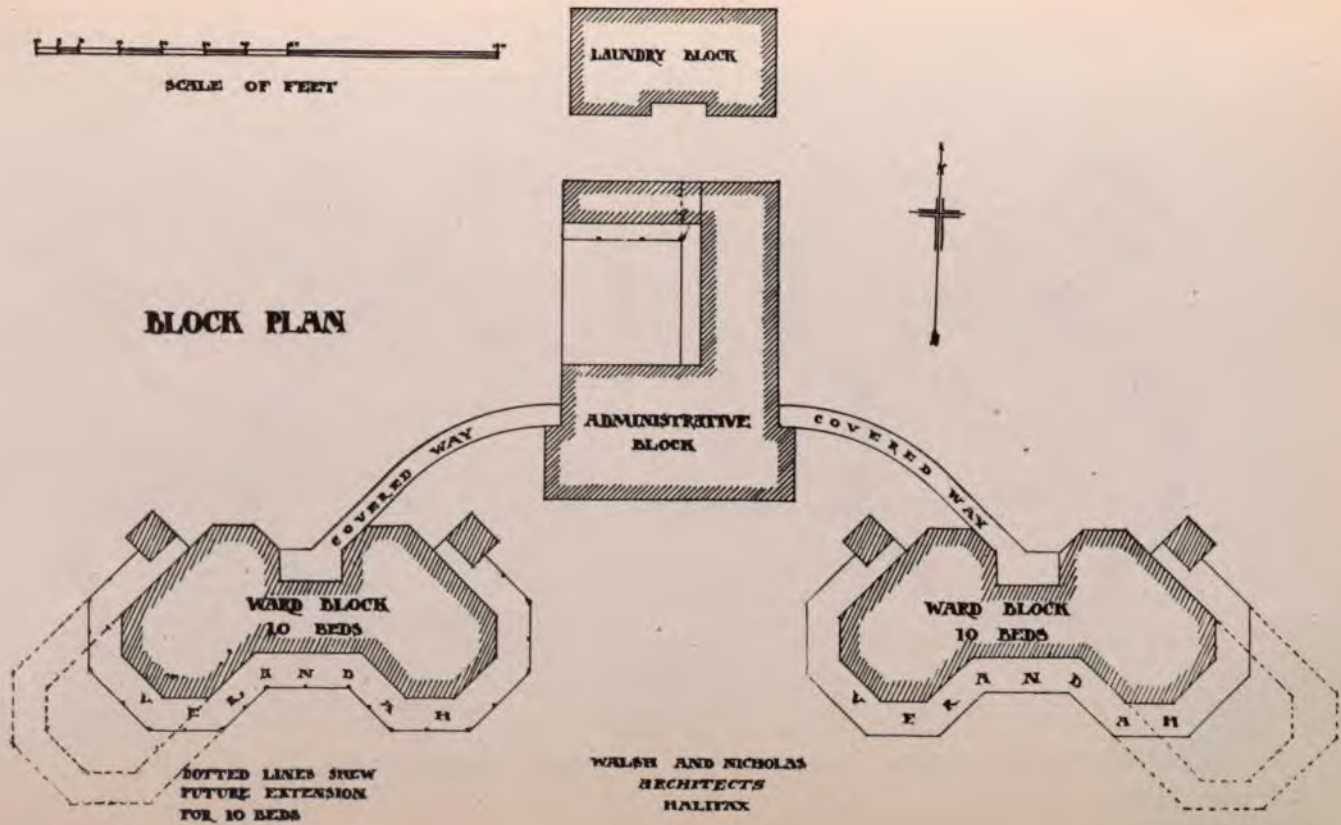
II.



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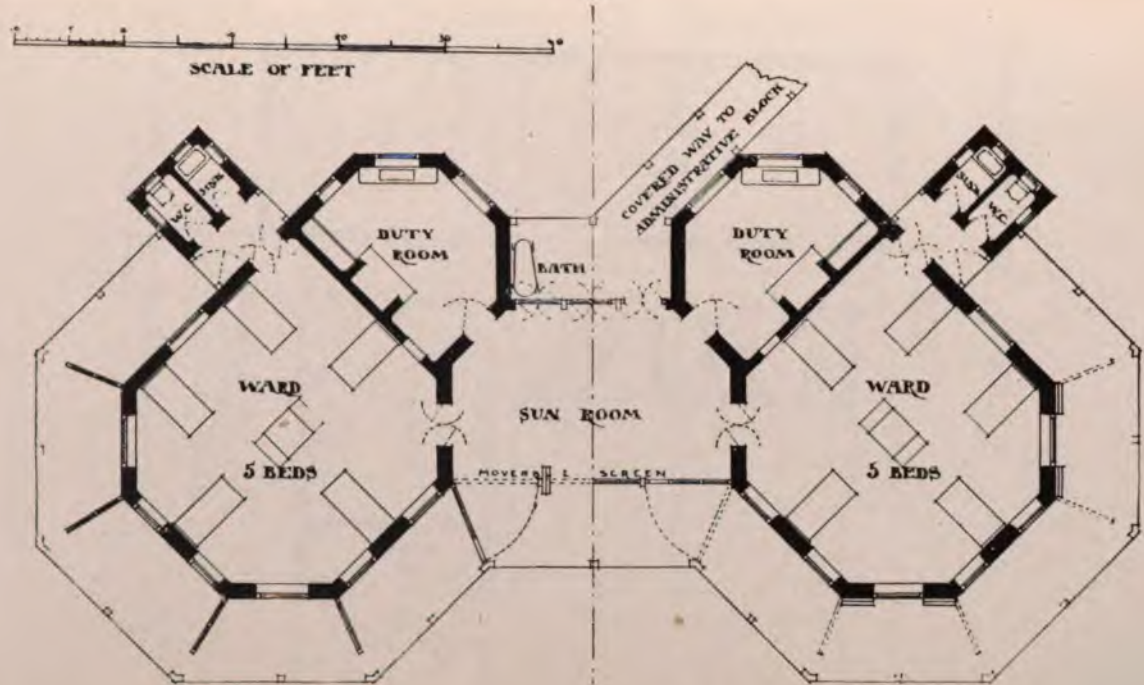
III.



~ SHEWING WIND SCREENS OPEN ~ ~ SHEWING WIND SCREENS CLOSED ~

~ PLAN OF WARD BLOCK ~

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HALIFAX

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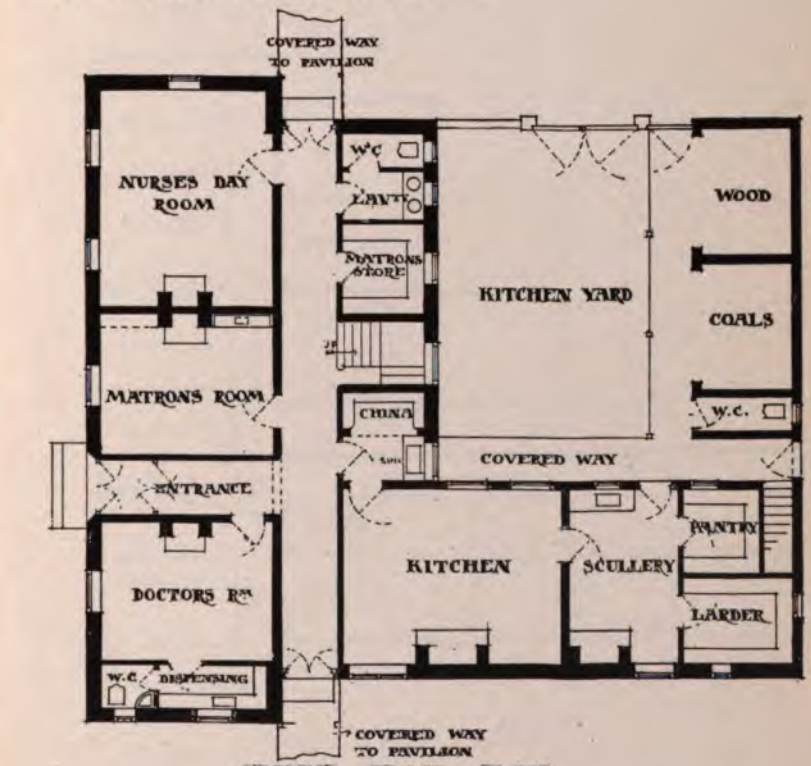
IV.

~ ADMINISTRATIVE BLOCK ~



GROUND FLOOR PLAN

SCALE OF FEET

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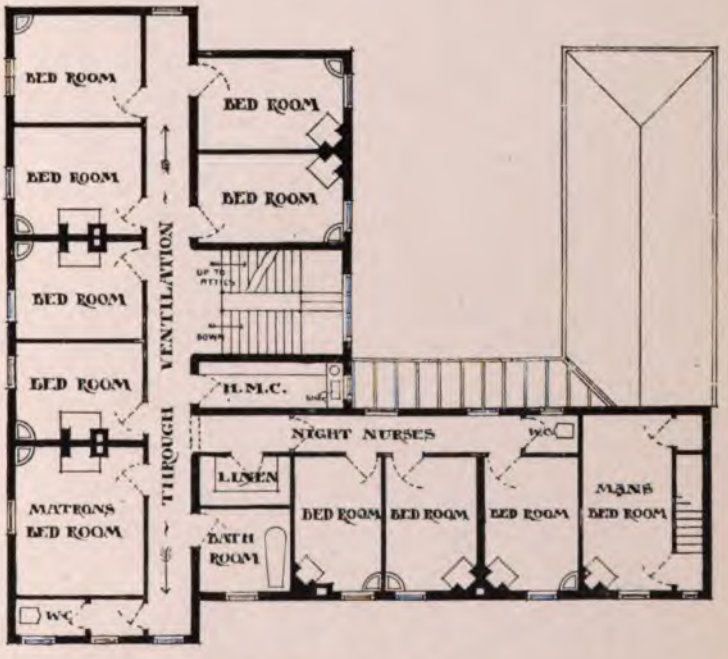
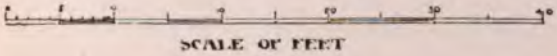
V.

~ ADMINISTRATIVE BLOCK ~



FIRST FLOOR PLAN



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HALIFAX

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periodically; but the saving of cost, taking into consideration the renewal, would hardly be worth consideration.

The cost (£300 per bed) may seem excessive, but even in Germany, France, and Switzerland, where labour is cheaper, I find that the cost per head varies—in Germany, from 3,093 to 6,765 francs; in Switzerland, 6,000 to 6,700 francs; whilst in France, the sanatoria of Hauteville and Angicourt cost 5,250 and 14,000 respectively. (See "Scalpel," September, 1899.)

The cost of maintenance at some of the Continental resorts varies from 2 francs to 5 francs per day, and we ought to be able to carry on our sanatoria at some such price. I certainly think the cost per head need not be excessive.

The necessary expenditure on medical officers, nurses, food, linen, ward requirements, disinfection, and the rest, must necessarily involve us in very considerable annual expense, however economically administered. In Germany, as we know, the sanatoria already erected have cost £1,000,000, and the yearly expenditure will probably amount to a quarter of a million, so that should we in any way attempt to imitate what has been done in Germany, and bring, through our Poor Law authorities or municipalities, hospital treatment within the reach of the consumptive poor, we must be prepared for an expenditure of millions of pounds,—money well spent in this war of humanity if we can succeed in restoring to health a certain number of workers, as is proved by Dr. Burton-Fanning in his report on the results of sanatoria treatment, whilst at the same time we are employing other agencies which aim at the destruction of consumptive breeding-grounds.

We must strike at the root and commence with the homes of the people, but even that would be useless unless we can awaken the people themselves to a sense of their responsibilities and make them appreciate the value of fresh air, the dangers of tuberculosis, the good effects of early treatment, the value of their children's health, the possibilities opened out by sanitation. All the agencies at work for sending boys to camps and girls to the seaside homes once a year, the friendly visits of inspectors and nurses, the improved dwellings and destruction of unhealthy areas, the possibilities opened out by our tram system of taking the people away into the country, must all surely tend to the building up of the race and limit the extension of consumption; but waiting for these possibilities, in which we are encouraged by our present statistics on the diminution of consumption from 38 per 1,000 in 1838 to 14 per 1,000 in 1895, we must still make provision for the present needs of the country, and for prospective ones, and we must face even the difficulties of expenditure.

I have not attempted to minimise the situation. So far as it affects our public bodies, especially boards of guardians, we are agreed on the great question of principle that consumptive patients should not be treated in the general wards of our Poor Law infirmaries, and the acceptance of this principle should involve a corollary that sanatoria for consumptives must be provided.

Halifax is distinguished for its liberality in providing for its sick poor. The Royal Halifax Infirmary, erected at a cost of £100,000, is a monument

to the munificence of its citizens, whilst the Guardians of the Poor have just completed a magnificent infirmary, also at a cost of £100,000, for the sick poor in their union. It is, I believe, capable of rising to the occasion of building a sanatorium for its consumptives, but it prudently wants to know what it has to provide before entering on any scheme which would involve a large expenditure.

SANATORIA FOR CONSUMPTIVES.

By EDWIN T. HALL, F.R.I.B.A., F.San.I.

Among the many and varied forms of energy that have marked the last century, none has been more noteworthy than the organised attacks made on those fell enemies of man, the diseases that have destroyed or shortened tens of thousands of lives, and enfeebled or embittered hundreds of thousands of other lives.

Led by men of medical science, gifted with large-hearted prescience, crusades have been preached to rid the world of one pestilent adversary after another. Sanitarians in general have joined their voices until the conscience of the nations has been awakened, forces have been organised, the battle has been set in array, and, despite of prejudice, ignorance, and deadly apathy, steady advance has been made, until slowly but surely the enemy has been driven back. Small-pox, that great and terrible scourge, no longer holds its deadly course unchecked, and, save when ignorant obstinacy refuses to assist, is headed and beaten back.

The latest of the enemies which the public has decided to reckon with is consumption, or tuberculosis of the lungs, and His Gracious Majesty the King, evincing his interest in this as in all matters conducive to the health and happiness of suffering humanity, has placed himself at the head of the movement in England.

Stated shortly, the *raison d'être* of a consumptive sanatorium is to provide a centre constructed on the latest hygienic principles, where advantage is taken to the fullest extent of sun and air, to teach the temporary occupants to adequately appreciate these blessings, and so to regulate their lives that they may go forth as apostles of health, carrying their knowledge into their various family circles. In this, as in everything else, each individual exercises an influence on his environment, and nothing but good can result from the spread of the gospel under the influence of which he has temporarily lived.

It is the function of the architect imbued with the solemnity of the subject, working hand-in-hand with the medical expert, to provide such a habitation for the exercise of the physician's skill that that may have its legitimate fruition and the crowning glory, under God's providence, of alleviating suffering, of arresting disease, of renewing vigour and sending out men and women the better for their discipline.

The writer has thought it will stimulate energy and assist the members of

this Congress if he lays before them some account of what has been done by other workers in the field.

The movement for what is called the open-air treatment of tuberculosis patients has been extensively practised in Germany for many years. As long ago as 1859 a sanatorium was erected in Siberia, at Golbersdorf, and since then the various German States and insurance boards have actively entered into the scheme, and numerous sanatoria have been erected. Some are in the nature of hospitals, adopting as *part* of their treatment open-air living. Others are in the nature of homes where patients in the earliest stages of consumption are received, and open-air living is the *primary* treatment, seconded by regular discipline in hours of rising from bed, of eating, and retiring to rest; by bathing, by graduated exercise—in short, by living on hygienic lines.

It may be convenient to lay down the main lines on which a sanatorium should be constructed, and in this connection it is to be borne in mind that it is recognised by nearly all medical men that to get anything like satisfactory results patients should be admitted in the first stage of the disease. In fact, cures appear to be in inverse ratio to the duration of the disease.

We will, therefore, assume that patients enter the sanatorium when first attacked. They are not then incapable of moderate exercise, nor are they expected to be confined to their beds. Of course it may be that temporarily they are weak, and that rest in bed may be necessary for a time.

First as to site.

A sandy subsoil should be selected, so that rain may be readily absorbed. Clay is relatively impervious, and a soil with clay not far from the surface gets waterlogged. Evaporation creates ground mists or fogs.

Again, a low-lying site on sand or gravel is bad, because the subsoil water percolates through the subsoil, and renders the earth moist and cold. This percolation also forces outwards ground air or air charged with carbonic acid gas. The site should, therefore, be elevated, but not on the summit of a hill. The ideal site is the southern slope of a hill sheltered from north and east winds by trees. On sandy soil the trees will generally be some species of pine, the resinous exudation from which is health-giving, imparting a clean and brisk flavour to the air.

It is sometimes held that the near presence of sheets of water is objectionable; but that, I think, only applies to ponds and semi-stagnant waters. A rapid river may be beneficial, owing to the change of air to which its movements give rise. Witness the case of Nordrach, in the Black Forest, where the Hammerbach, coming from the higher lands, passes through the village, close to some of the buildings of Dr. Walther's colony; or again Harlaching, near Munich, standing on a hill above the torrential Eiser.

The life and movement of such waters has a bracing and energising influence on humanity, whether sound or sick.

Given, then, a site on sandy subsoil amid pines, the next thing is to place the sanatorium in an elevated position. It is not good to put it on a flat plain. Shut in by woods, wlth a strictly limited prospect, the influence on a

patient is bad. There is a sense of confinement most depressing to all nervous temperaments. Hohenhonef, not far from Cologne, is high up the mountain, with beautiful and very extensive views of and beyond the Rhine. Nürnberg Engelthal, in Bavaria, commands a wide stretch of scenery. From Falkenstein, in the Taunus mountains at Cronberg, near Frankfort, the panorama is only limited by power of sight. Dr. Walters' sanatorium at Crookesbury Ridges, in Surrey, has in a less elevated position also entensive views.

Again, there should be a wide clearing on the south side of the building and in a less degree on the other sides. Admit to building and to gardens plenty of sunlight. The curative value of sunlight, with its germ-destroying power, is immeasurable. The clearing, too, gives the sense of freedom and lack of restraint. The charm of the seaside is largely the gratification of this sense.

Another point of great value is to set the building well away from a high-road, and in a sandy district this is of especial importance. Dust of any kind is of course very bad for affections of the throat or respiratory organs, and the dust from a high-road, laden, as it is liable to be, with fæcal matter, and carried about by high winds, is worse than all.

Of course a good water supply is essential. Where a public service is not available, a well should be sunk on the *higher* side of the sanatorium. It will there not be in danger of contamination from sewage, and also, once raised to the surface, the water will flow by gravitation to the building—a great saving in expense of maintenance.

Sewage purification and disposal are important matters.

I found among the South German institutions—both sanatoria and general hospitals—that it was the common practice to treat the sewage with an infusion of sulphur earth, a natural product of which, I believe, there are considerable deposits near Cologne. The mixing was a very simple process. At Falkenstein the mixture was contained in a closed vessel placed in the outlet chamber of a divided sewage-receiving tank. The inlet chamber received the sewage, from which, by a screen or tray, paper, etc., was separated. This chamber, at a certain level, emptied itself by a syphon. To the top of this syphon a small pipe from the mixture vessel was attached, and as the sewage passed it drew a charge of the mixture by suction. The effluent was then conveyed from the second chamber to another receiving tank at a distance divided into two chambers, and ultimately to four settling tanks, used in rotation; and, after a period ranging from two to four weeks, the liquid was discharged on to the land.

At the Nuremberg General Hospital, which is quite new, a more elaborate apparatus is used.

The main drains discharge into a cesspool or receiver, with an outlet trough at the level of the inlet pipe. This trough discharges on to a species of water-wheel contained in the central of three open brick tanks.

The two side tanks contain the sulphur earth mixture, kept in a state of agitation to prevent precipitation. The rotation of the wheel is arrested as

the bucket comes into position under the trough and is filling. While the filling is going on two small streams of the sulphur earth mixture flow in from the sides.

The treated sewage then passes over a weir to a channel, with an iron screen over it to catch foreign substances, and thence to two large circular settling tanks, intended to be used alternately, with funnel-shaped bottoms about seven metres deep in all.

Suction pipes are fixed to near the bottom of these tanks, and the heavier deposit is pumped up to a hydraulic press when the sewage is formed into cakes to be carted away for manure. The liquid from the tanks passes away.

At Harlaching, after similar treatment with sulphur earth, the sewage passes into the rapid Eiser. I am told all the sewage of Munich passes into the river without ill-effects, owing, I suppose, to the tremendous current.

At Nordrach the sewage goes into the ordinary closed cesspool. When this gets full it is emptied by means of a portable enclosed apparatus, probably known to many officers of health and sanitary engineers.

Briefly described, this is a cylindrical closed tank, mounted on cart wheels, with a long flexible suction hose. When the suction pipe has been let down to the bottom of the cesspool, a charge of chemical explosive expels the air from the cylinder through a valve, and the vacuum is immediately filled with sewage. This is carted away and spread over the land.

I did not hear of any case in South Germany where a septic tank treatment was adopted.

In the new sanatorium at Wokingham, in Surrey, there is a septic tank with two or three settling tanks attached, and from these the effluent passes on to the land.

Where the sewage can be delivered into a public sewer there appears to be no medical objection to its doing so without treatment. In London the sewage of the large scarlet fever and diphtheria hospitals so passes, and no evil results follow, as was conclusively proved by a Local Government Board Commission.

The great danger from consumption appears to arise from bacilli contained in sputum. When the moisture evaporates these bacilli are blown about and become a source of danger. In all sanatoria provision should be made for dealing with sputum by cremation.

At Nordrach each bedroom is fitted with a pair of lavatory basins—one for washing, the other for spitting. It seems to me the waste pipes of the latter must become contaminated, and in any case I do not like the idea of sputum passing into a pipe.

Having now dealt with these general features, we come to a consideration of typical sanatorium buildings.

It will be noted that all that I submit to your notice differ radically in planning. Unless otherwise mentioned, all the German institutions have double casement windows, are heated by low-pressure steam radiators, and are electrically lighted.

In some of the latest institutions, as Harlaching and Krailing, the

administrative buildings are separate and distinct from those containing patients, but not so in others nor in earlier ones. For example, at Falkenstein, which is the first institution I propose to describe, the kitchens, larders, etc., are in the basement of the block. It must, however, be borne in mind that this institution commenced in what had been a private house, and although by additions it is now a large place, the original house remains part of it. The staff, except the medical men, live in the block.

It will be seen by the general plan that there are detached blocks—engine and boilerhouses, stables for horses and cows, workshops, laundry, etc.

The main building, containing a basement and three floors above, one of which is in the roof, consists of a centre block facing E.S.E., with two symmetrical wings at a slightly obtuse angle, enclosing on three sides a terrace-garden. To the N.E. is a very large dining-hall open on the S.S.E. to a wide verandah continued in a N.E. direction to the chief doctor's house, and forming a covered promenade about 65 metres, or, say, 200 feet long. On the south side a long annex, with an enclosed verandah or gallery facing west, leads to another doctor's house containing the consulting-rooms, etc. On the east side of the gallery are the gardener's house, mortuary, etc. The total frontage in a straight line measures about 1,000 feet.

The sanatorium has accommodation for one hundred and twenty patients of either sex, with seventy single and twenty-five double bedrooms, generally of a large cubic capacity.

There are three main staircases.

The staff consists of a medical superintendent with three assistants, a managerial staff of four. The total staff, male and female, indoor and out, is ninety-two. There is one waiter to eight or ten patients.

There is no regular staff of nurses and no separate accommodation for them. They are only taken in if required by patients.

The patients' rooms generally face south or east, but others north and south-west; the majority are in single file on one side of a corridor, but there are several rooms on the other side.

There are two slipper baths for patients and a douche room in the basement. The w.c.'s are contained in the building.

The floors of bedrooms are covered with linoleum; the walls are plastered. There are no rounded angles.

The ventilation is by the windows.

The *Liegehallen* are attached to the building, forming wide verandahs on the three sides of the terrace at the level of the basement floor, which is above ground on this side. In the grounds there are large open pavilions and smaller summer-houses containing couches, all fancifully and luxuriously appointed, and in the building are winter garden, reading, writing, billiard, and music rooms. Altogether this is a high-class hotel, medically conducted, where wealthy patients may live cheerful lives in beautiful air and glorious scenery.

It may be worth noting that each patient's serviette is kept in a linen envelope—claimed as a very sanitary arrangement.

Ruppertshain, a few miles distant, near Königstein, is modern, is for poorer patients, and is more strictly a sanatorium. It is on plan a flat crescent three storeys in height above a basement, with two short wings, and accommodates 122 patients—ninety male, thirty-two female.

There are no separate administrative buildings, but the kitchen is in the west wing, on the ground floor.

There are eighteen rooms with one bed, seventeen with four beds, and six with six beds, of a cubic capacity per patient, for men, of twenty to thirty metres, and for women, of thirty to forty metres.

The staff consists of the medical superintendent, with two assistants, a secretary, and a lady superintendent or matron. There are three female and two male nurses, and twenty-four male and female servants.

There are two main staircases from bottom to top.

The patients' rooms face south and are in single file, with a corridor on the north side.

There are nine slipper baths for the patients and one douche for each sex, all in the body of the building.

The floors of bedrooms are of plain uncovered deal boards; the walls and ceilings are of plaster.

In the older portion of the building there are no concave angles to the rooms, but in that most recently built all angles are concave except at the floor, where they are most needed.

At the ends of the building there are two-storeyed *Liegehallen*, about twelve feet wide.

There are no fireplaces, and the ventilation is by the windows and doors.

One of the medical officers, who courteously showed me over the institution, was of opinion that wards with as many as six beds were not so good as those with only two or three. He thinks a few balconies to bedrooms, large enough to take beds, are desirable.

The Nürnberg Heilstätte, Engelthal, a few miles from Henferfeld, is a modern building—a parallelogram consisting of basement, three other floors, and then rooms in the gables.

There is no separate administrative block of buildings.

It affords accommodation for fifty patients in seventeen rooms, two containing five beds, two with one bed, the others having three beds each. The cubic capacity per patient is forty metres. There is one staircase, which is not sufficient for so high a building with so many residents. All patients' rooms face south, and have a corridor on the north side.

Dr. Bauer is the medical superintendent, and has no assistant.

There are three female nurses and seven female servants.

There are four slipper baths and three douches, all in the body of the building. There are six w.c.'s for patients, similarly placed.

A handsome dining-room faces south, and is served from the kitchen in the basement.

The floors are of uncovered deal boards. Walls and ceilings are of plaster and have concave angles, except at floor, which omission the doctor laments.

The plastered surfaces are artistically decorated, a feature which I commend to the notice of our hospital authorities.

The *Liegehallen* are quite detached, one being on the terrace at the south-west of the sanatorium, the other in the woods.

Ventilation is by windows and doors.

Dr. Bauer thinks it better not to have more than three beds in a room.

I should like to mention the great attention paid to the details of furnishing in this institution. The bedsteads are simple in manufacture, having foot-boards of iron covered with linoleum, with spring mattresses. The bed mattress is filled with kapock, an Indian fibrous material of which Dr. Bauer speaks well. The bedside tables are of zinc, enamelled, with glass tops, and zinc drawers, having rounded ends for cleanliness. In these the soap trays, tooth brushes, etc., are kept. The centre tables in the wards have ash tops unvarnished, and the legs and framework are of varnished deal. There are no drawers to them.

The next building I propose to describe is one of quite another type of plan.

The Städtisches Sanatorium at Harlaching is a few miles' drive from Munich, on the top of a hill, in a fir forest. This building may be described as a hospital. It is primarily for consumptives, but a few other cases of non-infectious character are received. They also make a speciality of dental surgery, and the dental operating-room is fitted with every kind of the most modern dental appliances.

Accommodation is provided for 212 patients, half of each sex, but the ultimate scheme is to add buildings so as to accommodate 600 patients.

Dr. Hermann is the medical superintendent, and there are three assistant medical officers. The remaining staff consists of a manager, a legal clerk, a clerk, and one matron. There are twenty-one female nurses (members of a sisterhood) and two male attendants. Of servants there are nine female and eight male, including engineering staff.

The hospital is a building E-shaped on plan, three storeys in height, with, I am glad to say, no basement rooms. Its main entrance frontage is towards the north. There are twenty-eight wards, six with twenty beds, six with twelve beds, twelve with single beds, and eight isolation rooms, each with one bed, but I think some of these last-named are appropriated for three-bed wards. The cubic capacity per patient is 36·36 metres.

There are four staircases, two in the centre and one at each end, and one lift. The windows reach nearly to the ceiling. There are twelve slipper baths and three douches, two slipper and one douche at each extreme angle, all contained in one room divided by partitions. There are eighteen w.c.'s for patients, badly arranged, each group of three with a slop sink being placed in one room, in the body of the building, with only one window. It is surprising to find such an arrangement in these modern buildings, an arrangement which the medical superintendents all condemn and lament.

The aspect of the wards is as follows :—The twenty-bed wards are axially east and west, with windows north and south. On the south side of the wards,

three storeys high, are the *Liegehallen*, about 12 feet wide. Dr. Hermann thinks these very conveniently placed, but too wide, and, owing to the fact that they are of solid masonry, arcuated on each floor, they keep off too much sun. Had they been 9 feet wide, with pillar construction, they would, he thinks have been admirable.

There are other *Liegehallen* in the grounds.

The twelve-bed wards are north and south, with windows east and west. The single-bed wards face east or west respectively, the isolation rooms north.

The floors of the wards are of concrete covered with linoleum. Walls and ceilings are plastered. No angles are rounded, a fact of which the doctor complains.

Ventilation, when windows are closed, is by means of warmed air inlet and by outlet shafts. Time is too short to allow me to describe these in detail. The fresh air is warmed by passing through a case containing a steam radiator, but Dr. Hermann complains that the air so heated is too dry. To me this statement is interesting, because I have always had this objection to steam radiators for heating such inlets. The same result does not arise when hot water is used.

The lighting is by electricity, and all the clocks are electric.

The day accommodation for patients is excellent. There are two adjacent dining-rooms in the centre for each sex, looking into the large quadrangles, and a reading-room to the south of these. There are two handsome chapels, one for Roman Catholics, one for Protestants.

The administrative block is north of the sanatorium. It is said to be sufficient for the ultimate scheme. The plan is very complete and admirable. There are, however, two points I venture to criticise, and these are: (1) placing the linen-drying rooms over the washhouse and finishing-room; (2) placing the disinfector in the basement of the main block.

The plan of the whole is a hollow square surrounding an open quadrangle. The south block contains the doctor's and priest's residences. On the south-west is the laundry; on the south-east are the kitchens, with dining-rooms attached for female staff, the residences of the assistant-matrons and nursing sisters. The west side contains the residence of the manager, servants, and engineer, and to the north of these the cow and pig stables, poultry-house, etc., with fodder-lofts above. The east side contains the stables, coach-houses, etc.

The boiler-house and engineer's department are in the centre of the "quad." The rest of the basement contains heating apparatus, disinfector, and very extensive cellarage.

The cow-stable is a regular feature at most of the sanatoria, and those I have seen are beautifully kept. The importance of pure milk is evidently fully recognised.

I quit the description of this institution with regret. One of the most modern consumption hospitals visited by me, I found it to be full of interest in all kinds of detail, and the many hours Dr. Hermann kindly gave up to explaining everything are amongst my most pleasant recollections.

We turn to yet another type of plan in the Volksheilstätte Krailing, about half-an-hour's walk from Planegg, in Bavaria. The whole district is a forest, principally of pines, and the Volksheilstätte is beautifully placed, and seems the ideal abode of rest and seclusion.

This is strictly a sanatorium for open-air treatment of men only.

It receives 120 patients.

Dr. Krebs is the chief medical officer. He has two assistants. The matron does the correspondence, otherwise the institution is managed from Munich.

There are twelve nursing sisters and three male attendants.

There are twenty-one servants in all, male and female.

The sanatorium contains a basement and three other storeys.

It consists of a central block with two wings at widely obtuse angles, and at the south-east and south-west intersections there are pretty chapels for Roman Catholics and Protestants respectively.

There are forty-three patients' rooms, containing 109 beds; thirteen rooms have single beds, fourteen have two beds, six have three beds, two have four beds, six have five, and two have six; but 120 patients can be accommodated if necessary.

The cubic space in single bedrooms is fifty metres, in other rooms from thirty to thirty-three metres per patient. There are two staircases. The doors have fanlights, but not to the ceiling. All patients' rooms face south, and of the multi-bedded rooms there are four with side windows.

There is an unobstructed corridor on the north side of the rooms.

The kitchen is in the basement of the central block, the dining-room being on the ground floor on the south side, with a sitting-room adjacent.

There are four slipper baths in one room on the ground floor, divided by curtains, and one douche room.

There are eighteen w.c.'s in groups of three arranged on each floor in one room in the heart of the building with only one window.

There is on each of the upper floors a room fitted with lavatory basins on both sides; in all there are thirty basins—the best accommodation I have seen in any sanatorium.

The floors of all rooms are covered with linoleum.

The walls and ceilings are of plaster, with concave angles, except at floors, the omission of which is of course complained of.

The patients' bedrooms are all on the first and second floors. The northern side of the ground floor of the west wing contains the matron's and nurses' rooms; that of the east wing the consulting-room, laboratory, doctor's bath-room and the patients' baths. On the south of these are corridors, and south of these again are the *Liegehallen*, about three metres wide. These form a structural arcaded verandah beneath the patients' bedrooms. There is also a *Liegehalle* seventy-eight metres long in the woods, fitted with eighty couches. The ventilation of the patients' block is by the window and by a central turret.

The medical officers' rooms are on the north side of the central block, with a committee room on the first floor.

At some distance east of the sanatorium is an administrative block connected by a subway.

This block consists of basement and three other storeys. It contains the boiler and engine houses, disinfector, accumulator-room, laundry, stables for cows and horses, and residences for the remaining staff and female servants.

I conclude the description of German sanatoria with that of the Nordrach colony in the Black Forest, nine miles from the little station of Biberach.

To describe this colony one must picture the locality.

The road from the railway ascends, and for some miles follows the river Hammerbach. The scenery is beautiful. On either side the hills covered with trees slope up from the river, sometimes gently, sometimes in bold escarpments. In the gray distance they rise to small mountainous heights dotted everywhere with trees, save for patches of greensward. In the midst the rapid river sparkling in the sun, which on the day of my visit also glistened on the snow-clad trees. Rising ultimately to a height of about 1,500 feet above the sea, we passed through Nordrach, where a sanatorium of the hotel type has just been erected, and some half-mile or more beyond we come to Dr. Walther's famous colony for consumptives. Here there is no sanatorium proper, but many small buildings dotted about the hillside. We alight at one containing the office and kitchens, with a long dining-room for patients attached. A wooden structure, simple enough in character, with windows on both sides and a gravel terrace on one side.

High up the hill to the left is the largest building of three storeys, containing rooms for twenty patients.

It consists of a long centre, with two short wings at obtuse angles of some 190 degrees, so that they face to the S.S.E. and S.S.W. At the intersection of the angles are hexagonal turrets. There are two staircases.

In this building, as in the others, each patient has a separate bedroom of about fifty cubic metres capacity.

All have single casements with fanlights, which latter are hung at the top and open outwards. There are balconies to some of the rooms.

The ventilation is by the windows and doors.

Each bedroom is fitted with a douche bath, supplied with hot and cold water. There are only two slipper baths altogether, and these are solely used for medical purposes.

There is only one w.c. for every ten patients, placed within the building.

The floors are of wood, covered with linoleum.

The walls and ceilings are of narrow boards, beaded not only at the edges, but on the solid parts, and there is a moulded wooden cornice. There are no concave angles. It is strange that all canons of smooth surfaces and rounded angles are here set at naught. The explanation probably is that there is no dust in the place.

I have before noted that each bedroom is fitted with two lavatory basins, one for washing, one for sputum.

There are no *Liegehallen*. Dr. Walthers objects to them. He says, "You should not make patients lazy, but active."

ere are a w ordinary summer-houses in the grounds.

Ar r building of two storeys is provided for sixteen patients, and the ms only about eight feet high. It is not only electrically lighted, but e radiators of the doctor's own manufacture.

The staff consists of Dr. Walthers and another physician of equal g, as the doctor was careful to tell me.

There is a secretary. There are no nurses as such, the doctor holding nursing, as we know it, "ought to be done by the medical men." There o female servants to every ten bedrooms.

parentheses it may be interesting to know that Dr. Walthers strongly s to the plenum system of ventilation, about which we lately heard a good and of which he has had experience.

here are various other buildings forming the colony dotted about here re. m is the doctors' house, with the sitting-room made so external wall or enclosure can be completely removed.

seen foregoing that Nordrach has nothing of the It is a hamlet on a mountain side, "far from ding crowd." provides varied refreshment for the body and mind. r the res world where patients place themselves under a medical man or st nasterful personality, who orders their being erally.

To live in such a position f simplicity under hygienic rules, to have no cares, and to be interested, is to be, as nearly as our mortal frame will permit, free from disease.

We have, however, to deal not with such an ideal place and life, but with the work-a-day world. For ordinary mortals, and specially for those of our poorer brethren, we must bring to their aid everything that sanitary knowledge of building can give.

Before leaving this part of my subject I wish to express my indebtedness to the following medical gentlemen who extended to me the most courteous hospitality, and gave me in the readiest way every information and assistance in my investigations. Dr. Hess of Falkenstein, Dr. Curschemann of Ruppertshain, Dr. Bauer of Nürnberg Engelthal, Dr. Hermann of Harlaching, Dr. O. Pischinger of Krailing, and Dr. Walthers of Nordrach.

It may now be of interest to briefly describe one or two modern English institutions.

I have had the pleasure of visiting the sanatorium near Crookesbury Ridges, under the direction of Dr. J. Rufenacht Walters. Dr. Walters is too well known as the author of an admirable book on sanatoria to need any other introduction here.

His sanatorium is a small one for twelve patients, but I am glad to learn it is about to be doubled.

The sanatorium consists of twelve single bedrooms on one floor, all with French casement windows facing south and opening on to a verandah, canvas covered, for reclining couches. A corridor runs the whole length behind.

There is one nurse, and she lives in the building.

The cubic capacity of the rooms per patient is about 1,100 feet.

The floors are of wood covered with linoleum.

The walls and ceilings are of plaster, with slightly concave angles, except to floor—a regretted omission.

The ventilation is by the windows, by inlet tubes, and by shafts at ceiling level across the corridor to the north. In the new block there will be fanlights to the doors, so that all the room may be scoured with air.

There is a room with one slipper bath and one earth closet, both opening from the corridor. In the new block these will have disconnecting lobbies.

The dining-room is attached, and also opens from the corridor, and beyond it are the kitchen and offices.

The heat is by hot-water radiators.

The lighting is by electricity.

It might here be opportune to consider the question of the best position for *Liegehallen* or reclining verandahs.

There is some difference of English medical opinion on the subject. It is held by some—and it seems to be a sound doctrine—that if patients are so delicate that they must lie down the greater part of the day, they should be as near to the medical man and to their own bedrooms as possible, so as to save the strain of even a short walk. In three of the five typical German buildings described, the *Liegehallen* form verandahs to the actual buildings, and the convenience of these is approved by the medical chiefs of all, the only complaints being in regard to excessive width and solidity of building. In one of the others there are reasons of planning why this cannot be done. At Crookesbury Ridges the same verandah scheme is adopted and approved, and is to be repeated in the new block.

In the perspective view shown by me as a design for a sanatorium, I have adopted this arrangement with a balcony over for half the building, and it will be seen the width and construction is such that the German objections do not apply. Dr. Hermann thought this arrangement very satisfactory.

A larger institution is that called Pinewood, at Wokingham, designed by Mr. F. Jones, who has kindly lent me a plan. This has accommodation for sixty-four patients, each in a single bedroom of an average cubic capacity of 1,100 feet.

The institution consists of a central block of three storeys, containing the consulting rooms, offices, and dispensary, with residences for the medical staff above. Detached from this on either hand is a patient's block of two storeys, containing thirty-two single bedrooms. These blocks face S.S.E. and S.S.W., and each has a corridor on the inner or northern side. There is one staircase.

The ground floor walls are of brick, the first floor is enclosed by wood framing covered with boards and tiles.

There is one resident nurse in each block.

The douche and slipper bath rooms and w.c.'s are on the north side of the corridor, and open directly from it.

The windows are single casements which do not reach the ceiling. The doors have no fanlights.

The floors are boarded and covered with linoleum.

Walls and ceilings are of plaster.

There are concave angles, except to floors, where angle fillets are fixed.

The heating of rooms is by open fires, that of corridors by hot water radiators.

Ventilation is by windows and doors.

Lighting is by electricity.

The administrative block is detached to the north, it contains a handsome dining room, with service and nurses rooms attached. Kitchen and offices, with female staff bedrooms over, and other rooms adjacent.

There is a laundry block with disinfector, an engine house, stables, etc.

I may now perhaps describe a sanatorium which the Brompton Consumption Hospital is about to erect at Frimley, in Surrey, from my designs.

It is to accommodate one hundred patients, and, unlike the others, it is for non-paying inmates.

There are fifty-two single bedrooms, twelve with two beds and eight with three beds. Every patients' room will face S., S.S.E., or S.S.W. Outside the central block is a wide paved terrace.

It will be noted that, unlike the German sanatoria, we have provided a large number of single bedrooms. By some it is held that for the poor rooms with more than one bed are best, as patients like company. On the other hand, others—among them Dr. F. R. Walters—hold that it is better for the patient's recovery, be he rich or poor, to have a bedroom to himself.

It must be remembered we contemplate that only first-stage cases (with exceptions) will be admitted, and every inducement should be given to make patients get out into the open air as much as possible, the bedroom only being used at night. Of course there are cases where it may be desirable for two or three to be together, as where bleeding is likely to occur, when one can help the other. We have therefore effected a compromise, fixing our maximum at three beds. Many of the German doctors with whom I have discussed the question favour this as the maximum when it can be adopted.

The sanatorium proper, or patients' block, is two storeys in height, and consists of a central block with four radial wings or pavilions, all built of brick, the upper storey tile hung on the brick.

By this arrangement any one floor of the two sides or of the four wings may be appropriated to women, leaving the others for men; and each group is self-contained, with its separate sanitary conveniences. It also affords much greater facilities for classification than could be found in one building of the ordinary type.

The main entrance hall is in the centre, and behind it is a day room facing south, with two three-bed wards at the sides.

East and west of the hall are the consulting and matron's rooms, dispensary, and sister's duty room.

The first floor has similar patients' and sisters' accommodation, a residence for the matron, and a bedroom for the housekeeper. Overhead, in the roof, are bedrooms, etc., for female servants.

The pavilions are connected to the centre by enclosed corridors having windows on both sides. Each wing contains twenty-two beds.

The corridor on the north side has no obstruction whatever to light and air.

Opposite every room door there will be a window in the corridor, and as all doors will have fanlights carried, like the windows, to the ceiling, we shall get thorough ventilation, and even on hot sultry days the cooler air on the north side of the building will induce a current to the hotter south side. The windows will be casements, those on the ground floor opening to the floor, so that, if necessary, beds may be wheeled out. The casements are so constructed as to keep out rats and other vermin while the windows may remain wide open. On the first floor there will be outside jalousie shutters, which can be closed either to exclude rain or intense sun heat, the windows remaining open. On the ground floor, rolling canvas blinds, like those over shops, will effect not only the same purpose, but will shelter beds or couches outside. By this means we get the advantages of a verandah.

On each floor are two large linen rooms, and on the ground floor are boot-cleaning rooms.

Between each pair of pavilions is a sanitary tower, detached except for a cross-ventilated lobby. This contains all the patients' w.c.'s, baths, lavatories and housemaids' closets. I have provided no urinals in the building. They are filthy things at best, and with lifting closet seats are unnecessary.

For the nursing staff on duty, separate lavatories and w.c.'s are provided on both floors.

There are two main staircases, and at the outer end of each pavilion a fire escape staircase.

The heating generally will be by hot water throughout, the lighting by electricity.

The floors will be of wood covered with linoleum, and all walls and ceilings will be of plaster with concave angles everywhere.

To the north of the sanatorium proper, and reached by a glass-covered way for wet weather, are the two patients' dining-rooms and a general assembly hall.

Behind are the kitchen block, female servants' hall, men's room, etc. At the east end is the nurses' home. To the west the medical officers' residence. Nearer the main road will be the laundry, boiler, and electrical engine houses, ambulance, mortuary and gate lodge. There are two laboratories.

The plans have received the most careful consideration of the medical staff, and I have particularly to express my indebtedness to Drs. Theodore Williams and Fowler, who, with the sub-committee, have gone minutely into every detail of the scheme.

In conclusion, may I be permitted to refer to the new Camberwell Infirmary in course of erection from my designs. There will be 800 beds in the institution. My reason for mentioning it here is that the Board of Guardians have, on the advice of the Medical Superintendent, Dr. Keats, and

myself, made special provision for treating tubercular patients. We have three large wards of twenty-four beds each, in which practically the whole length of the walls or enclosures on three sides are made to open, so that the patients may be said to lie in the open air, and above the wards are flat roofs with easy access, so that the patients can be actually in the open air all day long.

As far as I am aware, this is the first Poor Law institution in the kingdom where this has been done, and we hope it may be the means of bringing open-air treatment to the poor at their own doors in a practical way.

The subject of tuberculosis treatment is of such vital importance that, long as my paper is, I trust its length will be excused, and I can only hope I have not wearied you with too much detail.

LE SANATORIUM DE GORBIO.

PAR M. LE DR. MALIBRAN, *de Menton, Ancien Interne des Hôpitaux de Paris, Médecin en chef du Sanatorium de Gorbio.*

DANS des communications antérieures, j'ai contribué à faire connaître le sanatorium de Gorbio, près Menton (Alpes-maritimes).

Aujourd'hui, j'ai l'honneur de vous exposer les résultats obtenus dans ce sanatorium après une première année d'exercice.

Le sanatorium *d'hiver* de Gorbio, ouvert aux malades depuis le mois d'octobre jusqu'au mois de juin, composé de 53 chambres de pensionnaires, a reçu, pendant la saison 1900–1901, 57 tuberculeux.

Ces 57 tuberculeux sont venus, les uns spontanément au nombre de 11, les autres envoyés par leur médecin. En outre, un grand nombre de demandes, appuyées ou non de conseils médicaux, n'ont pu, pour des raisons d'ordres divers, être suivies d'admission. Cette multiplicité de propositions, dès l'ouverture du sanatorium, et la variété d'origine des patients, ne pouvait nous surprendre, puisque la situation climatique exceptionnelle de la campagne mentonnaise est universellement connue. Le classement des malades par nationalités fournit en effet les chiffres suivants :

allemands	2
anglais	4
arménien	1
belges	2
danois	1
français	25
hollandais	1
italiens	4
roumains	6
russes	9
américains du sud	2
	57

Les malades de Gorbio ont été entourés de soins variés tant au point de vue physique qu'au point de vue moral. Ce dernier point de vue a été pris en sérieuse considération, afin d'éviter, soit l'ennui, soit l'excès de distractions incompatible avec une bonne discipline. Quant à la thérapeutique proprement dite, elle a été principalement hygiénique, accessoirement médicamenteuse. Ainsi, en dehors de quelques indications symptomatiques visant la toux, l'hémoptysie, la douleur, l'état des forces, je ne donne jamais les inutiles ou nuisibles antipyrétiques. Chez les malades qui font des progrès normaux, je me borne à l'hygiène. Mais chez ceux qui n'engraissent pas malgré la cure la mieux conduite, ou qui crachent indéfiniment, j'administre les cacodylates de soude ou de gaïacol, lorsque l'état de la température ne s'y oppose pas. J'emploie aussi, dans certains cas, le traitement reminéralisateur de Gaube, du Gers, par les phosphates terreux et les chlorures alcalins.

Mais c'est surtout, je le répète, la cure hygiénique qui fait la base du traitement. Cette cure, de repos, d'aération, de suralimentation, est devenue classique. Toutefois son application aveugle et systématique peut être funeste. J'insisterai donc en quelques mots sur la façon dont je la comprends et sur la pratique que j'ai depuis longtemps adoptée.

1°. Le *repos* est systématique chez tous les tuberculeux dont la température, le pouls, et la courbe de poids ne sont pas satisfaisants. Suivant les cas, la cure sur la chaise longue est plus ou moins absolue et la quantité de marche soigneusement mesurée. Somme toute, je suis plus enclin à exagérer l'immobilisation que la dose permise d'exercice.

2°. *L'aération* est également systématique, en ce sens que les malades sont presque constamment à l'air libre ; mais le dosage de l'air est mesuré graduellement au début de la cure, et suivant l'âge ainsi que la constitution du malade. Je réprouve absolument la ventilation inutile et dangereuse par les courants d'air, que j'ai vu pratiquer naguère avec des résultats plutôt désagréables.

3°. Enfin, la *suralimentation.* Depuis que je soigne des tuberculeux, je n'ai pas changé d'avis sur cette méthode. Elle est parfois brillante en apparence parce qu'elle fait engraisser certains malades presque à vue d'œil si leur estomac est bon. Mais cet engraissement ne coïncide pas forcément avec une amélioration parallèle des lésions ; d'autre part, il est obtenu au prix d'un surmenage digestif souvent difficile à réparer. Enfin, dans certains cas, le tuberculeux, devenu dyspeptique, se trouve dans une situation pire, puisqu'il maigrit de nouveau et n'est plus en état de s'alimenter même à dose physiologique. Sans doute, il faut que le tuberculeux mange assez pour rattraper son poids perdu et pour compenser ses dépenses nutritives ; mais c'est une question de quantité et de temps. A Gorbio, on respecte la capacité digestive des malades. Si l'on met à leur disposition une masse d'aliments supérieure à celle qu'ils sont capables d'ingérer, on ne les oblige pas, en général, à dépasser les limites de leur appétit.

Voilà pour les conditions purement physiques des malades. J'ajouterai encore un mot sur leur état moral et sur la discipline qui les régit.

Des distractions suffisantes leur sont apportées, puisqu'ils ne s'ennuient

: et qu'ils t généralement gais. Mais l'observation du règlement n'en t pas Elle est assurée par une surveillance constante qui s'exerce to avec une bienveillante courtoisie, mais, quand il le faut, avec fermeté. Après une e ence de quelques mois, j'ai le regret de vérifier une fois de plus le caractère relativement indiscipliné et frondeur des malades de race latine.

Voyons maintenant quels sont les résultats obtenus dans de semblables conditions de climat et de thérapeutique hygiénique. Ces résultats, je me derai de les consigner dans une simple formule de pourcentage, stérile ement de chiffres dont nulle conclusion ne peut être tirée. Un sanatorium étant destiné à améliorer ou à guérir les tuberculeux, il va de soi que s mo nds ne doivent pas figurer dans ma statistique. On m'en a adressé, nd et je n'ai pas eu la c es renvoyer. Mais ce n'était pas mal le s Le qu donc dix malades atteints de consomption ava e par nt rebelles à toute cure, et j'enregistre 47 cas de tul ulose la commodité de la description, je dans les t Les résultats obtenus sont consignés e au

	Nombre de cas.	Améliorés.	Stationnaires.	Aggravés.
1er degré	17	14	2	1
2e degré	12	12	0	0
3e degré	18	14	1	3
TOTAL	47	40	3	4

En résumé, sur 47 tuberculeux à différents degrés, je note 40 améliorations. Or, tout l'intérêt de cette statistique réside dans l'étude des 7 cas rebelles à la cure du sanatorium. C'est ici que les chiffres doivent céder la place à l'analyse détaillée des faits. Je me borne à les résumer très succinctement.

1er cas. Tuberculose initiale chez une malade atteinte de psychose chronique. Nostalgie intense suivie d'anorexie et d'amaigrissement. L'état général est moins bon qu'à l'arrivée et la malade part après quelques semaines de séjour, sans augmentation des signes locaux. La tuberculose est restée stationnaire. Ici toute cure devait échouer à cause d'une maladie mentale intercurrente et ce fait ne prouve rien contre la cure de la tuberculose au sanatorium.

2e cas. Tuberculose initiale. Maintien d'un poids un peu inférieur au poids physiologique. Pas d'augmentation des signes physiques après plusieurs mois de séjour. Il s'agit ici d'une personne soupçonnée à juste titre de faire tout le contraire d'une cure sérieuse, et atteinte de constipation, d'anorexie avec fermentations gastro-intestinales vicieuses. Ce cas stationnaire aurait pu être amélioré avec une meilleure volonté de la part de la malade. L'absence de progrès est donc plus imputable à celle-ci qu'à la cure.

3e cas. Tuberculose pulmonaire initiale, tuberculose ganglionnaire cervicale et péribronchique. La fièvre, déjà existante à l'entrée du malade, s'accentue peu à peu et ce dernier part au bout de quelques semaines, aggravé et découragé. Ici, l'aggravation est nette; mais le malade eût peut-être pu, avec plus de persévérance, assister à la chute graduelle de sa période fébrile. Il est mort récemment à Davos. L'allure aiguë de ce cas imposait un pronostic sévère et la cure de sanatorium n'a pas la prétention de guérir tous les phtisiques.

4e cas. Tuberculose du poumon gauche, vaste excavation s'accroissant par poussées fébriles avec intervalles d'apyrexie et d'engraissement.

5e cas. Tuberculose fibreuse avec poussées granuliques et farcissement progressif des poumons.

6e cas. Phtisie chronique avec excavations bilatérales, notable amélioration locale et générale, sauf pour le poids qui diminue. J'ai compté ce cas comme stationnaire, malgré un léger amaigrissement, parce que la brièveté du séjour de la malade, la chute de la fièvre, la retour des forces et l'amélioration locale n'autorisent pas à dire aggravation.

7e cas. Tuberculose pulmonaire avec excavations bilatérales, lupus de la face et du larynx, fièvre continue. Mort plusieurs mois après, à Davos.

En résumé je crois avoir obtenu à Gorbio le maximum d'améliorations possibles dans les conditions les plus parfaites de climat, de confort et de discipline. Mes insuccès sont étrangers à la cure de sanatorium. Sans parler des incurables, on sait bien qu'il existe des cas de tuberculose rebelles à toute thérapeutique. Le sanatorium n'en peut être rendu responsable. On sait aussi que certains malades indisciplinables sont réfractaires à toute cure sérieuse, malgré la surveillance la mieux entendue. On ne peut les guérir de force.

SANATORIUM ET VILLA SANATORIA.

PAR M. LE DR. BARADAT, *de Cannes.*

MESSIEURS,—Un Congrès tenu en Angleterre, dans le pays qui envoie le plus de personnes aux contrées d'air pur et de soleil, était naturellement amené à donner une place importante dans ses travaux à la question des Sanatoriums. J'ai tenu à vous parler du système de la "Villa Sanatoria." Ce sujet m'intéresse personnellement, puisque, dans les différents congrès qui ont précédé celui-ci, notamment au congrès de Berlin de 1899 et au XIIIe congrès international de Paris de 1900, j'ai soutenu la cause que je viens développer aujourd'hui. D'ailleurs, j'ai eu la satisfaction de rencontrer parmi les défenseurs de la cure libre des maîtres d'une autorité universellement reconnue. Je n'aurai le plus souvent qu'à citer leur opinion.

Vous savez, Messieurs, que deux systèmes de Sanatoriums sont en présence. Le *Sanatorium fermé* où les malades retirés à leur famille se trouvent réunis

ensemble dans une sorte d'internat, soumis à une même règle sous la direction d'un même médecin, et le *Sanatorium libre*, appelé *Home Sanatorium* par le Professeur Landouzy et qu'on pourrait aussi bien nommer la "Villa Sanatoria." Le malade y vit à part des autres malades, dans l'isolement de son château ou de sa villa, entouré de sa famille.

Je vous rappellerai brièvement, Messieurs, les inconvénients du Sanatorium fermé. La cuisine faite pour un grand nombre d'individus est forcément plus négligée, les mets moins bien préparés; moins adaptés aux besoins de chacun, à des estomacs souvent fatigués et bouleversés. Or, la question de nourriture a une importance capitale dans le traitement d'une maladie où l'alimentation et la suralimentation jouent un si grand rôle. De plus, dans le Sanatorium fermé, le malade a un grand ennemi, l'ennui. Il commet les pires imprudences pour se soustraire à la monotonie de la vie agglomérée. S'il a l'habitude de boire, il continue à chercher dans l'alcool une excitation dangereuse. Il va et vient au gré de son caprice et se trouve de la sorte à la merci d'un refroidissement. La promiscuité du Sanatorium lui donne mainte occasion de flirt et souvent l'entraîne à des excès débilitants, bien qu'il aie un impérieux besoin d'économiser ses forces. Une forte discipline serait la seule garantie contre de pareils dangers, mais les pancartes affichées sur les murs et qui étalent, dans une belle ordonnance, la suite des règles à observer à chaque heure du jour sont pour la plupart des malades de simples mots sans force. L'autorité du médicin serait indispensable au Sanatorium, mais elle en est le plus souvent absente. Ces établissements sont trop souvent livrés à des Directeurs commerciaux qui laissent fléchir la discipline devant la perspective des gains rapides et des gros dividendes. Ils donnent à l'alcool sous toutes ses formes un large permis de circulation; ils ferment les yeux sur le flirt et ses suites; ils laissent aller et venir leurs malades; ils sont loin de se condamner eux-mêmes à une fatigante présence de tous les instants, et le Sanatorium, conduit d'une main indolente, entoure le malade de périls au lieu de le rendre à la vie.

Messieurs, je m'oppose au Sanatorium fermé au nom des mêmes principes qui m'ont fait rejeter l'internat en matière d'éducation. Je hais l'agglomération, je hais l'encombrement dans un même espace d'individus même sains, à plus forte raison de malades, qui par leur ensemble créent aussitôt un milieu bacillaire pernicieux. Dans la question du Sanatorium, comme dans celle de l'éducation, je suis contre le système allemand et suisse qui lutte contre la maladie par l'encasernement de malades et pour le système anglais qui lutte contre elle comme dit le Professeur Granger par le bifteck et le tennis.

Pour toutes ces raisons il ne devrait y avoir que des Sanatoriums fermés pour impulsifs, pour des malades incapables de pouvoir se diriger ou d'avoir une volonté, et des Sanatoriums fermés pour pauvres. Dans ces derniers sourtout, la discipline hygiénique y sera toujours rigoureusement maintenue parce qu'elle ne trouvera pas d'obstacle dans la complaisance intéressée d'un Directeur. Les hommes y seront séparés d'avec les femmes et le pauvre y trouvera une alimentation mieux préparée que chez lui, un milieu quelquefois plus aéré, et le repos. Ces asiles en pleine campagne lui donneront l'espérance toujours, et la guérison assez souvent.

Les difficultés du Sanatorium commun ont fait naître l'idée du Sanatorium personnel auquel se sont ralliés les premiers les Professeurs Landouzy et Lemaire, de Lille, le Dr. Lalesque, d'Arcachon, et le Professeur Brunon, par son système de la cure libre en Normandie. Les principes essentiels y sont appliqués mais les inconvénients du Sanatorium fermé disparaissent. Sans étaler l'attirail de chauffage et d'aération de ces internats de guérison, de ces casernes de tuberculeux, la maison de campagne, cabane ou château, laisse entrer l'air dans les chambres par les fenêtres largement ouvertes, les chauffe le jour au soleil et la nuit à un clair feu de bois. Chez lui, dans son home, le malade s'alimente à son goût avec une nourriture saine, bien préparée et dont il a l'habitude. La vie de famille le préserve de l'ennui, il n'a pas besoin d'alcool ni d'allées et venues dangereuses, ni de distractions énervantes. Il se trouve dans les meilleures conditions possibles pour observer l'hygiène et pour goûter le repos. D'ailleurs il ne faudrait pas croire que dans le Sanatorium libre l'absence d'un Directeur Surveillant se fasse sentir au préjudice du malade. Ici le médecin remplace le Directeur, il est le plus souvent l'ami de la maison, il remplace par son influence morale et toute proche l'autorité disciplinaire qu'exerce de haut le Directeur sur une collectivité. Il peut, comme le dit M. Lalesque, régler l'alimentation du malade, le soumettre au repos, cuber l'air qui convient à ses poumons et ordonner les exercices appropriés à son degré de force ou de résistance. En outre, plus accoutumé que le Directeur du Sanatorium au tempérament individuel de chacun de ses malades, il connaît mieux le genre de thérapeutique qui lui convient, et vous savez, Messieurs, que le Sanatorium, selon la parole du Professeur Landouzy, "n'est pas par elle seule la médication de la tuberculose pulmonaire comme la quinine est le spécifique de la malaria." Les médicaments appropriés à chaque malade sont choisis et appliqués par le médecin.

Il resterait à nous demander, Messieurs, dans quel séjour il faudra de préférence placer la Villa Sanatoria. Il y faut une réunion de circonstances utiles, un air pur, sec, peu excitant et un ensemble heureux de circonstances atmosphériques qui permettent au malade de jouir de cet air le plus possible. Il y faut la lumière et le soleil, ce grand destructeur de bacilles dont l'action bactéricide purifie l'air et le sol.

Une région en France présente assemblées toutes ces qualités salutaires, et c'est ici, Messieurs, que j'aurais scrupule à parler en mon propre nom. Je cède volontiers la parole, pour vous dire l'action bienfaisante de l'air méditerranéen, au Professeur Landouzy: "C'est sur la Rivière," dit-il, "mieux qu'ailleurs que le tuberculeux pulmonaire, le prédisposé à la tuberculose peut établir son Home Sanatorium, en un lieu où la température est de faible écart entre le jour et la nuit, et où des installations bien construites, hygiéniquement comprises, aseptiquement gouvernées, bien orientées, sont garanties aux malades. Il faut moins de luxe que de confort sanitaire pour réaliser la cure hygiéno-diététique. Là, sur la Rivière, le tuberculeux trouve dans l'ensoleillement de sa résidence aussi bien que dans l'air de la mer qu'il respire et dans l'aspect riant de la campagne qui l'entoure, de quoi se réconforter et tromper son ennui, sans excitation factice. Willis, au XVIIe siècle, envoyait

déjà dans ce coin de la France ses compatriotes pour lesquels il redoutait les épais brouillards de la Tamise. C'est là que James Henry Bennett, brisé, au fort de l'âge, par la tuberculose pulmonaire, abandonnant Londres, vint se réfugier. C'est de là qu'il a appris aux médecins des deux mondes toutes les ressources que le climat méditerranéen met au service des tuberculeux."

J'ajouterai, Messieurs, que l'illustre Chancelier d'Angleterre, Lord Brougham, fut le Christophe Colomb de Cannes, qui est demeurée la résidence la plus aristocratique de la Côte et le quartier favori des Anglais.

Tous ceux qu'attireront l'excellente salubrité de notre littoral méditerranéen, la vision charmante de la grande mer bleue, tous ceux qui viendront chercher sur nos rives le repos, la joie et la vie se persuaderont que la ville de Cannes eut raison autrefois d'adopter cette fière et jolie devise : " Qui li vèn li vieù " (Qui y vient y vit).

DIVISION IV.

PART II.

THE *RÔLE* OF HOSPITALS AND DISPENSARIES FOR CONSUMPTION IN THE PREVENTION OF PHTHISIS.

By J. EDWARD SQUIRE, M.D., D.P.H.,

Physician to the North London Consumption Hospital, etc.

If it were necessary to convince anyone of the importance of the subject the discussion on which I have the honour of opening, a remark made by Professor Koch in his epoch-making address last Tuesday would carry conviction to all. He said: "I should point to the founding of special hospitals for consumptives and the better utilisation of already existing hospitals for the lodging of consumptives as the most important measures in the combating of tuberculosis."

There are two main considerations in all preventive measures against tuberculosis—

1. The strengthening of the resisting power of the susceptible by general hygiene, etc.
2. The destruction of the infective agent.

It has been stated that attention to the first of these considerations is the most important and, even without any special measures for destroying infection, leads to the most satisfactory results.

Be this as it may, there is no doubt that the notable diminution of tuberculosis in this country is largely due to improved sanitation and general hygiene; for, till quite recently, no special precautionary measures had been directed against the spread of tuberculosis. At the present time much attention is being directed by the National Association for the Prevention of Consumption, and its branches throughout the country, to the need for such special measures, but we must not forget the importance of counteracting susceptibility in our anxiety to minimise infection.

In striving to diminish infection we have, amongst other things, to remember that all persons suffering from tuberculosis are possible sources of danger to others: the longer they remain affected with the disease, the longer they continue dangerous; and the further the mischief advances, whether in extent or in degree, the greater this danger becomes. To cure the disease early is thus the aim not only of the physician but of the sanitarian. During treatment, as well as when the disease has advanced beyond the power of the physician to cure, the sanitarian rightly requires removal of the source of danger from amongst the susceptible and, at the least, disinfection of all infective discharges or excretions of the patient. The sanatorium isolates the

patient whilst cure is—often successfully—attempted. Sanatoria are admittedly curative, prophylactic and educational, and are thus important factors in the scheme of prevention. The hospital for consumptives should be all that the sanatorium is, but to a fuller extent. Sanatoria can only admit the few, and are properly reserved for early cases, whilst residence necessarily entails cessation from the patient's occupation. The hospital should be ready to help all, whether capable of cure or incurable; those who cannot afford to give up their work, and cases too advanced to be eligible for the sanatorium; those who, though beyond the hope of absolute cure, may yet be enabled to continue work, and those who are not only past cure but past work also. To be complete the consumption hospital should provide for all these classes and for all stages of the disease. The incurables in the advanced and last stage of the disease should be taken in, not only for the purpose of alleviating their sufferings, but to isolate them and minimise the danger from them to others.

Out-Patients' Department.

Those who, though the state of their malady precludes the hope of absolute cure, may yet with medical help continue to support themselves should, in the out-patients' department, be enabled to keep at work and at the same time be instructed how to avoid being a danger to others. Those who are still curable should be treated till cured. The out-patient department is useful also in giving to doubtful cases an opportunity of obtaining an expert opinion, and thus tends to early diagnosis and treatment. The person who comes for advice rather because of anxiety about some loss of flesh and slight diminution of energy, than from any definite evidence of disease, can be examined by an expert; and thus commencing tuberculous mischief, unsuspected by the patient, may be detected. We all know the value of early diagnosis to the community (prophylaxis), as well as to the patient himself (cure).

Many cases therefore are, as out-patients, kept at work and enabled to continue to earn a living, who would otherwise have to give up; the predisposed are helped to diminish their susceptibility; and all are instructed as to the modes of spread of the disease and the measures—such as the proper disposal of the sputa, etc.—which will minimise the danger. The latter is perhaps the most important *rôle* of the out-patient department in prevention.

The institution of dispensaries for consumptives, as advocated by Professor Calmette, and already established in Lille, would be of great value. Such dispensaries should be affiliated with the consumption hospitals.

In-Patients' Department.

The hospital wards receive those who are able (or obliged) to give up work, and cases specially recommended from the out-patient room. The accommodation is, however, generally much below the requirements, and the stay of each

patient must of necessity be short. The main aim of the physician here must be to enable the patient to get back to work for a time: amelioration rather than cure is the object to be attained here in the majority of cases. Whilst the patient is in hospital he is taught how to regulate his life to the best advantage of himself and of his neighbours—an educational *rôle* of great value in prevention.

Sanatoria.

More, however, is wanted to complete the work: the hospital requires other departments. Many of the patients presenting themselves to the out-patient physician might be cured by sanatorium treatment, and would gladly avail themselves of such treatment. There should therefore be, connected with each consumption hospital, a sanatorium in a healthy situation in the country to which suitable cases could be sent, possibly passing first through the hospital wards, where they could be under continuous observation for a few days. Cases also whose improvement in the wards justified the expectation of cure if treatment could be prolonged might be sent to the country sanatorium.

Homes for Advanced Consumptives.

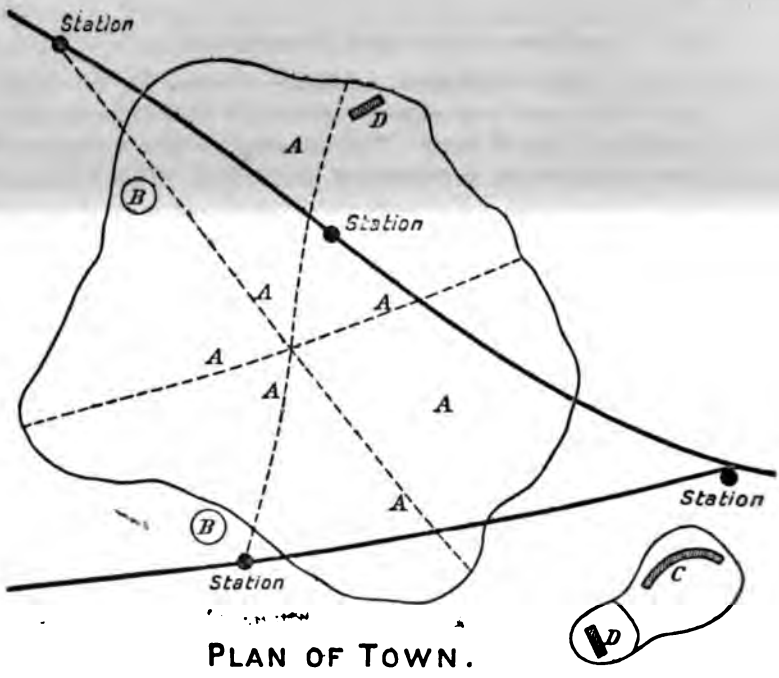
There is still another department advisable: a home for the dying, or home of rest for advanced consumptives—practically an isolation hospital for the most dangerous class of cases. The advantage of such a department is obvious to all who aim at the prevention of tuberculosis. This building, like the sanatorium, might be in the country; and out-of-door work in garden or farm attached to these institutions would provide healthy employment to some of the quiescent cases, who would then be able to relinquish an unhealthy occupation in the town. Can we hope to go still further and have horticultural and farm colonies for the more permanent residence of those "cured" at sanatoria, and who, as we know, often relapse on their return to unhygienic surroundings? It would be a great advantage if horticultural or agricultural colonies could be formed. Healthy outdoor employment would minimise the risk of relapse in those discharged from the sanatorium; and at these farms consumptives drawn from the crowded parts of towns, who would be in danger of relapsing if they went back to their town work, could be taught enough to enable them to take healthy agricultural work in the country.

Whether the hospital is entirely supported by the voluntary contributions of the charitable, or by the municipality or board of guardians, or whether these are all associated in the work—which would seem to offer certain advantages—it is desirable that all the departments mentioned should be combined in one scheme. All the different departments are at present in existence, though to a very inadequate extent. Out-patient rooms and dispensaries, consumption hospitals, sanatoria, homes for advanced consumptives, and poor-law infirmaries all do useful work. But the undoubted good done by these institutions is diminished by their want of mutual association, and the

advantage to the community if all these departments could be combined in one scheme would be very great. Few, if any, consumption hospitals combine all the departments mentioned; they have out-patient departments and wards for in-patients, but few at present have a convalescent home or sanatorium in connection with the hospital. The North London Consumption Hospital, to which I have the advantage of being attached, has its out-patient department in the crowded district of Tottenham Court Road; its in-patient department is on the healthy high ground near Hampstead Heath, and by the generosity of an anonymous benefactor a sanatorium connected with the hospital will shortly be built near Northwood.

Communication between these departments by 'bus, tram, or rail is easy and direct. The usefulness of the hospital would be increased if a home for advanced consumptives allowed of the removal of incurable cases from beds which would then be set free for cases susceptible of improvement and return to work.

The scheme as it presents itself to my mind for a large town is, then, as follows:—



PLAN OF TOWN.

Railways.
Tram and Bus routes.

A. Out patient Departments or Dispensaries.
B. Consumption Hospitals.
C. Sanatorium.
D. Homes for advanced Consumptives.

A.—One or more dispensaries or out-patient departments in the poorer districts where consumption is prevalent.

B.—One or more hospitals for in-patients situated in less crowded and more healthy districts of the town, or on the outskirts, but within easy reach by public conveyances—trams, 'buses, etc.—of the poorer districts from which the patients are drawn.

C.—A sanatorium in the country, within easy reach by train of the hospital.

D.—One or more homes for advanced consumptives, within easy reach of the poorer districts, so that the inmates remain within touch of their relatives and friends.

All these, if not under one management, to be brought into association so as to work in connection with one another.

THE "ÉMILE ROUX" ANTI-TUBERCULAR DISPENSARY AT LILLE.

By Dr. A. CALMETTE,

Director of the Pasteur Institute at Lille; Professor of Hygiene and Bacteriology in the Faculty of Medicine.

Last year at the "French Commission on Tuberculosis," I mooted the idea of establishing in every manufacturing town anti-tubercular dispensaries, to be called by any name that might be suitable, but to be specially adapted for education in hygiene and for the home assistance of indigent workers suffering from tuberculosis. In the hope that the Government and the large departmental and municipal administrations would busy themselves in constructing sanatoria for the people or with a system of funds for compulsory insurance against the disease and the disablement caused by it, as in Germany, it seemed to me indispensable that the struggle against tuberculosis should be energetically taken in hand in its most deadly centres by interesting the patients themselves and those surrounding them in this struggle, through a system of education in hygiene and home relief which could be organised rapidly, immediately, and inexpensively.

The number of tuberculous workers in the large manufacturing towns like Lille, Roubaix, and Tourcoing, for example, is so great that it will probably never be possible to guarantee to each of them a sojourn of three or four months in a sanatorium. In the single town of Lille, which numbers 220,000 inhabitants, there are about 6000 poor suffering from tuberculosis, almost all under relief at the expense of the board of charity. Each year 1000 to 1200 of them die. The patients spread contagion and misery around them. Works of private charity are powerless to help them, and the board of charity itself cannot assist them otherwise than it does all the other poor with which it is burdened; it distributes bread to them; sometimes assistance in the shape of rent-money, of milk or of soup; it guarantees them drugs and medical

ts intervention is not suited to the needs of each patient or

n reasons for my thinking that an organisation specially devised in of the struggle against tuberculosis in populous centres commanded , and that its creation was a necessity.

Dispensaries should, in my opinion, *precede and complete* the foundation of atoria.

They should precede, because they afford us an opportunity of selecting with all desirable care those patients most suited to profit by the open-air cure.

They should complete it, because it would be their province, after the departure of the tuberculous patient to the sanatorium, to look after and assist his family, because, after the return of the patient, ameliorated or cured, it would be their work to keep in touch with him, to supervise him, and continue his education in healthy habits; finally, because, better than any other institution, they would have the charge of assisting at home those who would be suffering too severely to be treated in the sanatorium or hospital.

The chief mission of the dispensaries should consist in searching out and attracting workers attacked with or suspected of tuberculosis by means of propaganda disseminated intelligibly in populous centres; in affording them free consultations and advice for their family; in distributing free among them spittoons and antiseptics, and as frequently as possible gifts, food, meat, and milk; to take all steps in relation to public benevolence, works of private charity and benefactors, so as to obtain for the patient relief that will permit him to break off his work or resume it when he is relieved or cured; finally, to guarantee to patients every material and moral assistance of which they may be in need.

For the realisation of this conception I did not consider that I ought to await the initiative of public authorities. I resolved to open a subscription, with the kind support of the Lille press, and, thanks to the generous rally of my friends, I have been able to collect in some few weeks, in the town of Lille alone, the sum of 46,000 francs.

At the same time the municipal council became interested in the work, voted a sum of 30,000 francs and placed at my disposal a site for the construction of a first model dispensary next to the Pasteur Institute, on the condition that in five years this dispensary should become the property of the municipality. I therefore became leaseholder, for five years, of a site belonging to the town, on which I could *build* with the town's money, *organise* the work which I had planned on my exclusive responsibility, and *direct* it at my will for five years.

On his part, at Liège, my friend Dr. Malvoz, Director of the Provincial Laboratory of Bacteriology, undertook a campaign with the same aim; and, thanks to the alliance of a wealthy Belgian philanthropist, he succeeded in the month of July, 1900, in opening a first dispensary in what room he had at his disposal in his laboratory. Some months after, other similar institutions were established at Verviers, Huy and Mons.

In France the idea has already made way. There has been for some

weeks past in Paris, at the Rue Mercadet, Montmartre, a dispensary which was established by Dr. Bonnet, and the expenses of which are discharged by a generous manufacturer of the district. This work undertaken against human tuberculosis has similarly been the means of starting another under the auspices of a committee of physicians.

At Arras the larger number of medical men have started a subscription amongst one another, with the help of some prominent inhabitants, with the view of establishing a dispensary. A large manufacturer at Nantes, whose enlightened philanthropy offers a noble example, has just devised an annual income of 21,000 francs for the same purpose, and Dr. Chacherau, director of the bureau of hygiene of that town, has the responsibility of organising the work.

Without doubt, before long all the great towns will follow the foregoing examples. Truly there are to be found everywhere men sufficiently foreseeing and unselfish as to comprehend the importance of these institutions and their practical bearing on prophylaxis and relief, especially adapted as they are for a struggle against a scourge more terrible than great epidemics and great wars, since the tribute we yearly pay it in France is that of 150,000 lives of young men and young women from fifteen to forty years, at a time of age when strength is greatest, and they are in all the plenitude of their social usefulness.

And if private initiative were wanting at this point, which would be very surprising in a country like ours, the municipalities or charity organisations will certainly undertake the work. It is in their economic interest; it will not require much reflection to demonstrate that fact to them.

The Anti-Tubercular Dispensary of Lille, which bears the name of the Émile Roux Dispensary, has been in full working order since the 1st of February, 1901. Whilst we are waiting for the nearly approaching completion of some merely ordinary fittings which are intended for it, we borrow part of the premises of the Pasteur Institute for the routine of free consultations This routine of consultations is absolutely guaranteed by the physicians, who have kindly lent their gratuitous assistance in the work.

Each morning, from 10 to 11 o'clock, two consulting physicians are in attendance at the dispensary. They examine fresh arrivals, and those patients who have been relieved when there is occasion for following their cases up.

The patients present themselves for the most part spontaneously, because they have learned either from the papers or in individual conversation of the existence of the work and its great usefulness among the working-class. Far from dreading admission, they stream in, in such a great number that one is obliged to fix their several turns. The idea that there we receive only the tuberculous does not cause them any repulsion; they have a neglected cold—an old cough of which they cannot get rid; they dread tuberculosis, and that is quite enough to make them come and ask what they should do to avoid it. Others, numerous enough, who have been coughing for a long while, and are obliged to cease work at intervals for months together, know that their lungs are attacked; no longer able to gain their living or provide for the wants of their families, they have already knocked at many doors. Private charity is

tired of coming to their assistance. The board of charity doles them two or three loaves a week, and three to five francs' worth of assistance in paying the rent, monthly, that is if they have at least three children. Humiliated and weary of begging for alms they go on working till their bodily strength fails them; then they stop, waiting for the time when they must take to their bed for good. These have heard it said that the dispensary makes an effort to come to their aid; discouraged and hopeless, they come and ask our assistance in their deep misery.

Each of those who come is first questioned by the physicians who attend. They are asked their name, surname, address, age, and profession; their social rank is inquired into, their material resources and their needs, their past history, morbid, personal, and hereditary; they are auscultated and questioned as to the symptoms they manifest.

If the patient is recognised as tuberculous or suspected of tuberculosis after this first summary medical examination, and if he says that he is without means, and has no physician treating him, he is given a numbered order and a card of admission to the dispensary. On the back of the card is written the date on which he should present himself again.

He is next given a bottle in which he is to bring his sputum the evening before the day he is summoned, in order that a complete bacteriological examination may be made of it before the complete medical examination to which he will be submitted.

Lastly, he is enjoined to remain at home so as to be ready for the visit of the inquiry-maker the same day or the next.

The home inquiries are carried out by a working-man assistant, attached to the dispensary, who has special instructions in view of the important services he has to render. To carry out these duties at Lille, we have selected an old working wool-comber, secretary of a mutual aid society, equally familiar with the Flemish and French languages, thoroughly acquainted with the needs of the lower ranks to which he belongs, capable of putting himself in touch with the patients, to whom he must explain and report upon all the advice and prescriptions that have been given them.

The selection of this inquiry-maker is exceedingly important. He must be intelligent and active, have a pleasing aspect, speak with sufficient authority to enforce it on the patients, be interested in their physical and moral sufferings, become as much as possible their confidant and friend; lastly, he must be a devoted collaborator of the physicians, and the mainspring in the work.

Thus understood, his intervention with the patients is accepted and wished for, instead of being met with defiance or indifference as is that of the official inquiry-makers of public relief, who are too often dominated by official or administrative prejudices.

The working-man inquiry-maker or assistant betakes himself then to the house to which he is directed, talks with as much familiarity as possible with the patient and those about him, obtains information as to the hygienic situation of the house, the expenses and resources of the household, the more pressing

needs which it would be well to satisfy. He takes down replies to the numerous questions on the inquiry schedule which herewith follows, and reports to the dispensary all information of the kind to enlighten us as to choice of means of relief there is reason to adopt in each particular case.

EMILE ROUX DISPENSARY FOR THE PROPHYLAXIS AGAINST TUBERCULOSIS.

FORM OF INQUIRY FOR THE WORKING CLASSES.

Date No. of Order

Assistant Inquiry-Maker:

Surname and name of the patient seeking advice

Age Nationality

Residence

Occupation

Patient sent to the dispensary by M. . . . .

Medical man in attendance

Does the patient reside in a house of his own?

Does he live alone?

Has he children? and how many?

What are the children's ages?

Has he lost any children?

Of what disease, and at what age?

How does the patient obtain his daily living, when able to work?

How many hours a day does he work on an average?

For how long has the patient been obliged to give up work?

What occupation do his wife and children carry on?

How much do his wife and children earn per day?

How much money had the household at their daily disposal before the illness?

How much money have the household had at their daily disposal since the illness?

Names and addresses of the employers { of the husband. of the wife. of the children.

Has the household parents or grandparents to support?

Is there anything owing to the landlord, and how much?

Is there anything owing to tradesmen, and how much?

To what tradesmen does the household owe money?

Has it pawned furniture, clothes or various articles? which?

Does the household receive relief from public charity?

Does it benefit by private acts of charity? Whose?

Does the husband belong to a mutual aid society?

Does the husband belong to a trades' union?

Do the children go to school?

Does the mother place her young children under the care of crêches or in the houses of women who mind them?

Does the patient remain at home?

Can he work at home, and has he work?

Can a search be made to procure it for him?

What kind of work can he do?

Can he go out to look for work or to take exercise?
Has the patient sufficient nourishment?
Has the patient warm clothes?
Has he bed-clothes?
Where does the patient spit?
Does he understand the necessity of not spitting on the ground and of destroying the sputa in the interests of his health?
Is the exercise of his occupation possible?
What, in the opinion of the patient, is the hygienic situation of the workshop in which he is employed?
What beverage is the patient in the habit of drinking?
What quantity daily?
What are the more immediate needs of the patient and his household?
What can be asked on the patient's behalf from his employer?
What can be asked of the board of charity?
What form of relief can the dispensary grant him?

Hygienic Condition of the Dwelling.

Of how many rooms is the dwelling of the household composed?
Number of rooms inhabited?
Does the patient occupy a bed by himself?
What are the dimensions of the patient's bedroom?
How many persons sleep in the patient's room? Which?
How many beds are there for all the family?
What is the state of the bedding?
How many families inhabit the same house?
Does the house possess a court or a garden?
Does the patient's room look out on the court or the street or the garden?
How many windows has it?
Can they be opened easily?
What is the source of the drinking water: well, or town supply?
If there is a well, how far off is it from the water-closets?
When and how is the washing done?
Where and how is the linen dried?
Cleanliness of the patient's room and of the house generally?
Is there space to cleanse and whitewash the patient's room?
Is the patient willing to have his room or dwelling cleansed and whitewashed?
Is it necessary for him to change his abode?

This schedule of inquiry thus contains all those useful points in which the dispensary may be able to intervene successfully either with masters or employers, or with the charity board, or authors of private charity, so as to obtain necessary assistance for the patient or his family. The dispensary itself, out of the sources at its disposal, will supply what is absolutely indispensable.

If the household owes money to the landlord, and if, in spite of the intervention of the dispensary they are threatened with eviction, the rent is paid until the patient can begin work again.

If, when all resources have come to an end, he has been obliged to pawn his clothes or bedding, they are redeemed for him at the expense of the charity. If he occupies a tenement which is much too unhealthy and confined, where ventilation is imperfect, other quarters are found him, whenever possible

composed of two rooms, and in an airy district; the expenses of removal are paid for him, and if there is absolute need, the first month's rent.

If the bedding is defective, and if the patient expectorates much, he will be supplied with an iron bedstead furnished with sheets and coverlets. He will be supplied with clothes and woollen stuffs if he needs them. Finally, if there is not enough food, we endeavour to arrange that the charity board shall supply bread, soup, and coal; and the dispensary on its part will supply the best meat or milk so far as its resources permit of so doing.

Each individual case is separately examined, independently of the official schedules, and we endeavour to respond to the most pressing indications by adopting that method of relief which it seems should be the most effectual and the best suited to the circumstances.

The patient returns to the dispensary, furnished with his admission card, on the day which has been appointed for him.

On this occasion he is examined from a medical standpoint; a clinical schedule is made out for him, and this comprises:—

1. Chest measurements in circumference.
2. Weight.
3. Expectoration: nature and quantity of the sputum; presence or absence of bacilli; presence of microbes.
4. Register of physical signs of lungs by graphic method.
5. Examination of the circulatory functions; examination of the digestive, renal, and cutaneous functions.
6. Examination of the larynx, if there be occasion.

This clinical schedule is drawn up on a uniform plan for each patient It will be completed each month by a fresh examination, and by the addition of a fresh leaf with memoranda as to the state of the organs, improvement or aggravation in condition that may have supervened. On this leaf the consulting physicians will make notes of indications which in their judgment will be of use to the assistant in considering what relief should be afforded. Each month the patient will have to bring the sputa, which will be submitted to bacteriological examination.

If the patient does not return to the dispensary on the day appointed, the assistant goes to his house, learns the reason for his absence, brings him back for consultation, or rather, takes the necessary steps for his admission to the hospital.

At the time of the first consultation the physician endeavours to impress upon the patient that, since he has put himself under the protection of the dispensary, he must rigorously carry out all the instructions that have been given him. He is taught to expectorate in such a way as not to disseminate germs that may transmit the disease to those about him. He is supplied with a pocket spittoon and shown how to use it.* He is also given a table

* The models of the table-spittoons and the pocket-spittoons which I have perfected and adopted are of blue glass, most convenient and extremely cheap. The price of the pocket-spittoons is 0·60 fr., and that of the table spittoons 0·50 fr. They are made by M. Leune, 28 bis, rue de Cardinal Lemoine, Paris.

n, a li of two per cent. solution of lysol* for the spittoons, and a memora lum of instructions very simply drawn up, in which he will all ential items of advice which have been given him orally.

ndum of instructions will, moreover, be commented upon t the patient's very home at different intervals by the who will also be charged with the duty of explaining to those of the old the precautions that must be taken to avoid contagion.

ne assistant will visit the patient about once a week, without warning, so that the advice he has given is followed to the letter, and ner... of assistance given are utilised as they ought to be.

course of his visits he will advise the housewife never to sweep the ary; he will show her how to regulate the ventilation of the room; he point out to her what precautions should be taken for washing the linen. explain to the patient that he ought never to spit on the ground, use the dried sputa contain virulent matter which, when mixed with the st, run a constant risk of re-infecting him and of preventing his recovery. He will make an effort to convince him that it is necessary, *in his own interest*, to expectorate into a vessel containing an antiseptic such as lysol, so as estroy the noxious germs that these sputa contain in so large a number. T owing is the text of the instructions handed to each patient at the ry and explained to him at his home by the assistant.

Instructions to the Patients.

Lung troubles should always be treated at an early stage so as not to become phthisical, that is to say tubercular. Although one be already suffering from tuberculosis, one can be cured by strictly adhering to the hygienic rules laid down at the dispensary.

Be careful never to spit on the ground, because the expectoration may contain microbes dangerous to you and to those living with you. The expectoration dried on the ground gets mixed with dust either indoors or out of doors; and those breathing such dust may become tuberculous or may help to aggravate the disease already established.

When you are at home or in the workshop always spit into a vessel half filled with lysol or with carbolised water.

When you go out always carry a pocket spittoon with some lysol in it, and you must never spit elsewhere than in such a spittoon.

Every evening this spittoon must be cleaned by putting it into a saucepan with cold water in it, and allowing it to boil for some minutes. If this cannot be done, then the contents must be emptied into the latrines. The

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* I have chosen lysol as an antiseptic, because it offers certain valuable advantages. It is composed of creosol, of potassium and of olein; its antiseptic potency in regard to the tubercle bacillus is sufficiently effective, and in virtue of the potassium it contains, it acts well in dissolving the sputa without coagulating them. Its odour is as agreeable as that of creosol and it is scarcely more expensive.

same must be done for every vessel that has been used as a spittoon and washed with lysol.

Do not use pocket-handkerchiefs for spitting into, and should a pocket-handkerchief be used let it be boiled in water every evening.

Let the patient try not to cough unless he is obliged to expectorate.

Never swallow your expectoration.

When you cough or when you sneeze cover your mouth with your hand.

Wash your hands, face, and especially your beard, several times every day in water.

Avoid draughts, damp places, and never go into dusty places.

Never allow your room to be dry brushed. Before sweeping it, the floor should be well sprinkled to avoid raising the dust.

Never sleep in the same bed with another person, and try to avoid sleeping in the same room with any one else.

Always sleep with your window open, or slightly open, and cover yourself well to avoid catching cold.

During the day rest frequently, and try to lie down on a bed or a couch several hours every day in front of an open window.

Walk out in full sunshine and with a hat on. Avoid going out when it is windy, rainy, or dusty.

In the morning wash your chest well with cold water and rub the body energetically.

Rinse your mouth well with water mixed with a little lysol. Wash your teeth on getting up in the morning and at bed-time.

Eat as much meat as possible, especially beef, which must be thoroughly cooked. Raw or undercooked meat can only be eaten when quite fresh or it may cause internal trouble.

Drink a great deal of milk even whilst eating.

Eat several meals a day—four at least if possible.

Avoid drinking spirits; gin and all liqueurs injure the stomach, destroy your strength and prevent your cure. If you wish to recover and to be preserved to your family do not drink spirits.

A small quantity of beer will not hurt you, but take care not to drink more than a litre a day.

Go to bed early; do not frequent public-houses where tobacco smoke and dust would make you cough and would fatigue you.

Do not smoke.

Amuse yourself by playing at indoor games with your children and friends. Read books and try to avoid excitements, anger or worries.

By following these rules you will certainly be cured.

Whenever you require advice come to the dispensary; you will there get advice as to what course to pursue; if you cannot work for yourself or for the wants of your family, the dispenser will try to help and succour you.*

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* We prefer recommending our patients never to eat anything but well cooked meat, because it often happens in poor families that meat and meat juice kept too long turn bad and produce gastro-intestinal troubles, sometimes even bad cases of blood poisoning.

Our advice thus given is well received, because as far as our resources will allow we accompany it by some material help under the form of tickets for milk, meat, bedding and clothes.

But we limit ourselves to giving the patient and his entourage an education in hygiene and such care as his condition requires. Besides antiseptics and cod liver oil, we do not give any medicines unless it be under exceptional conditions when the patient requires a medical prescription or a calming potion, when we send him to his own doctor, if he has one, or to the charitable bureau doctor or to the district doctor.

Thus we avoid as much as possible the reproach which has unjustly been levelled at us, of taking away some patients from doctors, by welcoming at our dispensary only very poor workpeople. Our work is of the useful social and preventive order, because we thus find out the greatest possible number of cases of tuberculosis. This is a work undertaken in all countries by charitable and administrative organisations, but often very unsuccessfully.

The Cleansing and Disinfection of the Patient's Linen.

The prevention of tuberculosis in populous districts can only be efficaciously managed by constant supervision of the patients and of their families, by repeating frequently the hygienic advice which they have received by the consulting doctors of the dispensary. This is the work of the assistant visitor.

But we have considered that it would be extremely useful to try and obviate in poor families the contamination of the soiled clothing, which according to our observations have to be washed and dried often in the one and only living room in the midst of the sick and the children. This clothing kept dry for more or less time in a corner spreads infection and dangerous germs, and even if they could be sent out to be washed at the expense of the dispensary there would be a grave danger in entrusting them to a laundress without having first been disinfected.

For these reasons we have decided to organise at the dispensary a washing establishment. This service will be conducted from next October under the following conditions: Each of our assisted patients will receive a metal box with a cover in which all the dirty linen of the family will be accumulated. This box will bear the number of admission at the dispensary, the linen will be stamped with the same number.

Each week or fortnight the box will be delivered to the collector of the laundry.

The linen will be steeped in a receptacle filled with an antiseptic liquid, will be washed by steam in a rotatory disinfected washing machine and will be dried by steam. It will be sent folded but not ironed to the house of the owner, in the box which will also have received an antiseptic washing.

This cleansing of the patient's linen will not only constitute an important preventive measure, but will be a practical form of help which the family thus assisted will not fail to appreciate.

Medical Service of the Dispensary.

We thought it best on starting and during the period of organisation to institute a service of simple consultations like those of the charitable bureaux, but with this difference, that the advice is given as much as possible by the same doctor to the same patient, so as to inspire both one and the other with a reciprocal interest.

Our consultations take place daily in the morning. They are given simultaneously by the doctors, who each have two days of duty a week. There are thus six doctors all told, with sufficient proxies, who are advised should one of the regular doctors be unable to attend.

For the present the resources of the dispensary are very restricted and we have preferred to reserve them entirely for the help of the patients. The doctors who have spontaneously come forward to generously give us their assistance receive no salary, but this is only a temporary arrangement, and as soon as our organisation is completed we shall ask one of the doctors who was the first to come forward to help us to take in hand the administration of the work. We shall then begin, as soon as our income will allow it, a system of presence marks for the consultants.

As therapeutic treatment does not come within our aims we have not considered it necessary to establish a pharmacy. We limit ourselves to distributing to our patients antiseptics, spittoons, and cod liver oil to such as require it.

When a special medicine is required we send the patient to his own doctor or to the charitable bureau to which he may belong.

Sending Patients into the Country or to Paying Sanatoria.

We at first thought of choosing amongst our patients those who do not expectorate bacilli, and of placing them at our expense in the country in families who would undertake to receive them. We thought thus to cure or improve a certain number whilst awaiting the establishment of free sanatoria where patients could be sent. We have given up this idea for many reasons. The experiment thus tried by Dr. Malvoz, at Liège, has shown us the grave inconveniences of this system, which induced Dr. Brunon to write recently to the Academy of Medicine on "Paying Sanatoria." The poor patients—placed either alone or in groups of two or three in the homes of peasant families—are badly cared for; they do not obey the orders which have been given them; they misuse their freedom like children.

The peasants who have agreed to receive them do not always give them the required nourishment, being, above all, desirous of making money out of their boarders.

Lastly and most important, though the patients are chosen with great care amongst those who do not expectorate bacilli—many whole villages protest against their admission. The peasants fear the spread of tuberculosis, and,

incredible though true, they dread it not so much for themselves or for their families, but for their cattle! Therefore we must definitely abandon the idea of paying sanatoria, or of sending isolated cases of patients belonging to the working and necessitous classes into the country.

The paying sanatorium can in certain cases be advised for rich patients—able to profit by the intelligent care of their *entourage*, and reasonable enough to obey medical orders. But it is inadmissible in the case of poor patients. The latter can only be efficaciously looked after, without danger to the surroundings, in special establishments, that is to say, in sanatoria equipped with all necessaries in order to insure to the patients a strictly hygienic treatment, the air cure, rest, sufficient nourishment, and perfect disinfection of soiled linen and of the products of expectoration.

The anti-tubercular urban dispensaries must do the rest; and, in default of free sanatoria scientifically managed, it is best to leave the poorer patients in their own homes when they are curable, to assist them as well as possible, to furnish them with the means of suspending their work, of resting, and of taking sufficient nourishment in their own homes. Thus one can best help them and watch over them.

Plan and Management of the Dispensary.

If necessary, any habitation—a private house, for instance—can serve as an anti-tubercular dispensary; it suffices to arrange three or four rooms—an office for the inscription of the patients, a waiting-room, a consulting room, and a small laboratory for the bacteriological examination of the expectoration. It is thus that the dispensary created by Dr. Malvoz is provisionally worked at Liège, awaiting the construction of a building for which the funds are already forthcoming.

We must note that the locating of a private house as an anti-tubercular dispensary is not accomplished without difficulties. Many owners of houses positively refuse to let their property on lease for such a purpose, fearing to find that it will finally be depreciated on account of the profound terror inspired by propagandists, who have spread exaggerated notions on the contagion of tuberculosis.

It will, therefore, always be better to acquire a house than to build one on purpose.

At Lille, whence the idea of anti-tubercular dispensaries emanated, it was necessary to try and create a typical dispensary to serve as a model and an example to other large industrial towns, whether French or foreign.

This dispensary, constructed as simply and as cheaply as possible, is to-day almost finished.

It is composed of a small building on the ground floor, 10½ metres in length by 8½ metres in width, divided into six rooms:—

A waiting-room for patients;

Two consulting rooms;

One dark chamber for laryngoscopic examinations;

A laboratory which can also be used as a third consulting room;

An office for the assistant visitor.

Below there is a hot air arrangement worked by steam at low pressure. In an annex building next to the dispensary and composed of three halls on the ground floor we have arranged a laundry for the sterilisation and cleansing of the linen of such patients as receive this assistance.

This laundry comprises:—

A hall for the reception and steeping of linen;

A hall for the sterilisation and washing, with a disinfecting washing machine and a wringer;

A steam drying place opening into a hall reserved for the folding and keeping of the clean linen.

The total cost of these constructions, including the furniture, the steam heating apparatus, and the installation of the laundry, is 30,000 francs. The materials employed are brick, cement, and porphyrolite. All the rooms are arranged so that all the washing and evacuation of water used may be easy; the walls have rounded angles: the wood of the doors is absolutely plain. It is lighted by electricity.

The plans of the dispensary have been drawn out by Mr. Hainez, architect, and the construction has been done by contract by Mr. d'Holluin-Greun, builder.

The installation of the laundry has been executed by Mr. Degoy, hydraulic engineer, 42, Rue Massèna, Lille.

Financial Organisation.

The expenses of construction and the first installation are entirely covered by the sum of thirty thousand francs, voted for this purpose by the Municipal Council of Lille.

Only the funds for the management have to be found either by grant, or by subscription, public or private.

For the work the only actual funds of which we can dispose are those derived from a public subscription started in January, 1901, in the town of Lille—a subscription which produced in a few weeks forty-six thousand francs. This small capital will be increased gradually by voluntary gifts, and we hope that many rich and generous people interested by our highly humanitarian and essentially practical aims may contribute largely, and supply us with the means of carrying on our struggle against tuberculosis by continuing the work on the lines on which we have started. During the first four working months, from the 1st February to the 1st June, 1901, we admitted 236 patients for consultation at the dispensary.

The number of patients recognised as tuberculous was 157. All received pocket spittoons, table spittoons, and antiseptics. They return periodically to be examined, and are given for themselves and for their families such advice as may be necessary.

Sixty-seven of them urgently required material help; they were provided with all that was necessary to enable them to nourish themselves sufficiently—

to get proper lodging and clothes. The others were recommended to the charitable bureaux or to their patrons.*

The number and the cost of the patients helped in each month, from the 1st February to the 1st June, have been:

In February, 31 patients attended, having cost altogether 1253 francs 52 centimes, averaging 40 francs 43 centimes per head.

In March, 53 patients attended, having cost altogether 957 francs 99 centimes, averaging 18 francs and ·08 centime per head.

In April, 58 patients attended, costing altogether 1359 francs, averaging 23 francs 20 centimes per head.

In May, 52 patients attended, having cost altogether 1240 francs 53 centimes, averaging 23 francs ·05 centime per head.

Altogether we have spent 4811 francs ·04 centime, and monthly, 1202 francs 76 centimes.

To this sum must be added 600 francs (150 francs a month) for the salary of the visitor, and 30 francs for the antiseptic spittoons, printing—which amounts to 5711 francs and 4 centimes—the working expenses during four months, and to 1427 francs 76 centimes, the monthly average of these expenses; altogether about 18,000 francs a year, not including the expenses of the medical service, which has not yet been remunerated. During this beginning we have had to manage our resources very economically, but in order to follow out fully the aim which we have in view, it would be necessary to furnish each of our poorer patients both for themselves and for their families with the material help necessary to them. Such help should include the rent paid direct to the landlord, about 12 francs a month.

Tickets for food representing for the patient alone two francs a day and fifty centimes more for each member of his family out of work by the illness of the head of the family. The gratuitous washing of the linen estimated at one franc per month. Supplying coal for warming and cooking purposes, four francs per month. The upkeep of bedding and clothes, three francs a month, altogether eighty francs at least for each assisted patient. At present the means at our disposal do not enable us to assist as we would wish to do those in need of help. We are obliged to limit ourselves to the distribution of tickets for milk and meat to the poorest patients, and we have to reserve each month an important part of our funds for the purchase of bedding and

* This is the text of the letter that we address to the patrons of the tuberculous and poor working people when we consider it useful to appeal to them:

SIR OR MADAM,—I have the honour to inform you that the Anti-tubercular Dispensary has admitted M , living at and employed by you as . This patient, attacked by tuberculosis, requires to be helped and succoured; we shall give him and his family our assistance, but we should be grateful if you would help us in this work, and we beg you to contribute in such a way as you may consider right, either by sending direct to the patient such articles of first necessity (food, clothes, blankets, coal, etc.) or by sending us sums of money which will enable us to furnish the patient with such objects and to prevent him from falling into abject misery during the rest from work which his illness necessitates. If you wish it we shall be pleased to keep you informed of his state of health.

Receive, Sir or Madam, the assurance of our distinguished consideration.

The Directing Doctor of the Dispensary.

linen, for rent for those patients whom we have been obliged to lodge in rooms less insanitary than their own. Thus by the 1st June we have already furnished under the head of loans (to avoid forced sales and distraint) twelve beds furnished with eighteen blankets and fourteen pairs of sheets, and we have paid the monthly rent of three patients.

Our aim will not have been accomplished until we shall be in a position to completely assist all the tubercular patients whose necessary cessation from work would otherwise condemn them to utter distress.

Only for the town of Lille we can gauge that about six hundred patients a year would have to be thus assisted. One can estimate that each patient assisted will require complete or partial help during four months, so that there would be forty patients to succour each month at eighty francs a head including help to the family. This would mean a monthly expenditure of 3200 francs—say 40,000 francs a year, which sum should come either from private or public charitable contributions in the interest of those who may possibly suffer from tuberculosis even more than in the interest of those already stricken.

Conclusion.

I have explained in sufficient detail the organisation of our dispensary at Lille, so as to make it easy to understand its working.

The reader will have been able to understand the essentially practical aim which I have wished to attain, and which I hope to realise, with the help of a few devoted medical men who have generously offered me their services, should our material resources not fail us.

We specially desire to give the masses an education in hygiene by using working people to spread in populous districts the hygienic precautions necessary to stop the dissemination of tuberculosis. We do not think that we shall cure many tuberculous patients by just giving them the means of feeding and living under better conditions, but amongst those who come to us some can be easily cured—a little rest and good living will enable them to resist the disease. These will be sent to the public sanatoria when the pensions and insurances for working people shall at last be created, and it shall have been decided to build such sanatoria, for it would be impossible to count on private initiative to ensure their working. The other patients, the most numerous alas! those who understand the gravity of their illness, when it is too late to stop its course, those who can find no room in the hospitals, and who, encumbered with a family, try to earn their bread until they fall down worn out and dying, these will be taken under the protection of the dispensary, which will assist them according to their necessities. It will furnish them with the means of livelihood without endangering their surroundings, without sowing infection and misery around them.

Is this not already a large enough object, and should not society, anxious to preserve its members efficaciously from the ever-spreading growth of such a scourge, endeavour, even for self-protection, to multiply works which have such aims in view? Not only is it its duty, but also its interest, for with each life prematurely suppressed some part of the social capital disappears.

THE MANCHESTER HOSPITAL FOR CONSUMPTION AND DISEASES OF THE THROAT AND CHEST AND ITS WORK IN THE CURE AND PREVENTION OF PHTHISIS.

By SIEGMUND MORITZ, M.D., M.R.C.P. (Lond.),
Hon. Physician to the Manchester Hospital for Consumption, etc.

The Manchester Hospital for Consumption was founded in 1875, and was at that time, and continued to be until the present day, the only institution of its kind in the district. The hospital consists of an out-patient department centrally situated in Manchester, and an in-patient department nine miles from Manchester, at Bowdon. Whilst the number of in-patients provided for was originally only a small one, the work done in the out-door department became soon of considerable and ever-increasing magnitude. The numbers of out-patients, which were 1,874 in the year 1882, have increased to over 11,000 in 1900, with a total number of attendants of nearly 34,000 in that year. During the years 1882 to 1900 a total number of 127,262 patients have presented themselves at the out-patient department, and the number of attendances was close upon half a million.

Naturally, for the ever-increasing number of patients, larger and larger premises had to be provided, the present out-patient department was last altered and enlarged in 1891, and it now includes a Receiving Room, a large and lofty Waiting Hall capable of seating 200 patients, three consulting rooms, etc. Two members of the staff and an assistant medical officer attend daily.

With regard to the results of the treatment amongst these numerous cases, it is found impossible to give trustworthy statistics, since patients cease to attend from causes other than that of relief or cure, and without being formally discharged. So far, however, as can be judged, a large proportion of the cases are much improved and again able to follow their employment.

Here, as elsewhere, it is found that comparatively few of the consumptive patients present themselves in an early stage of the disease. Thus it comes that though the limited accommodation of the in-patient department should permit the selection of the most suitable, *i.e.*, early cases only, frequently the benefit of the doubt as to their suitability is extended to more advanced cases; again it is found that many will not or cannot become in-patients, as they cannot afford to deprive their families of their earnings. It is in these cases that the great want is felt for some arrangements similar to the working-man's insurance schemes in vogue in Germany.

Every patient before being admitted as an in-patient has to present himself for examination at the out-patient department, and there receives

treatment up to the time of admission; unfortunately, with the limited number of beds, patients frequently have to wait a month or two before they can be admitted.

The out-patient department enables the staff to keep the patients who have been in the hospital under observation and treatment.

In addition to the medical advice given to the patients, the following measures are taken to inculcate some of the principal rules of hygiene and prophylaxis suitable to cases of phthisis:—

Firstly. Each out-patient receives a leaflet dealing with the causes and prevention of consumption, and pointing out the need for fresh air and cleanliness, and the precautions to be adopted when the disease shows itself.

Secondly. Patients with cough and expectoration are furnished with a suitable form of pocket spittoon.

Thirdly. Since 1894, in all cases where overcrowding and other unhygienic circumstances are suspected, notice is given to the Medical Officers of Health of Manchester, Salford and Oldham, and the Medical Officers of these towns kindly undertake to see to the disinfection and cleansing of the dwellings of such patients free of charge. In Manchester, since the introduction of the voluntary notification of phthisis in 1899, notice is given of every case of phthisis coming under treatment. Very rarely have objections been raised by the patients to such notification, and the introduction of similar notification for the borough of Salford, whence a very large number of the patients come, is ardently looked forward to.

For the reception of in-patients, a hospital with eighteen beds was opened in 1885 at Bowdon, nine miles from Manchester. The sheltered position, the sandy sub-soil, the renowned salubrity of this suburb of villa residences, and its accessibility, together with some external reasons, led to the establishment of the hospital in this situation.

Before the year had elapsed, two wards to hold twenty beds were added by the generosity of the Chairman of the Hospital, Mr. William J. Crossley, thus raising the accommodation to thirty-eight beds. In 1890 Mr. Crossley further added two wards containing fourteen beds, thus bringing the total to fifty-two beds, at which the number stands at present. These wards were constructed under most approved principles: 120 square feet of floor space, and nearly 2,000 cubic feet of air were given to each bed, whilst by a special system of ventilation the introduction of 5,000 cubic feet of fresh air per bed per hour was secured. In 1899 verandahs and *Liegehallen* were added.

Though the demand for a larger number of beds had become more and more pressing, it was felt that the hospital could not be further increased on its present site. Seeing this ever-growing want, Mr. Crossley came forward with the princely offer of £50,000 for the purpose of building a sanatorium for Manchester. After a prolonged search for a suitable site, it has now been

finally decided to build this sanatorium in Delamere Forest, about thirty miles from the city. A site has been purchased, and operations for building a sanatorium, according to the most approved principles of the present day, have been commenced.

Mr. W. Cecil Hardisty, of Manchester, the architect, is exhibiting the plans in the Museum. The hospital will give accommodation to seventy-six patients to begin with, but a further extension, to which the plans lend themselves, is contemplated. This will be additional to the present hospital.

The site, which has an altitude of 470 feet above sea level, and an area of sixty-six acres, falls gradually to the south-east, and the buildings will occupy the north-westerly end. It is well sheltered from the east by woods and hills, another belt of wood affording protection from the north. The main building is so arranged that all the patients' day-rooms and bedrooms have an aspect to the S.S.E., thus securing for them the maximum amount of sunshine. On the ground floor, the main entrance occupies the centre of the front, in close proximity to which are placed several rooms of administrative nature, viz., clerks' and matron's offices, waiting-room, the medical officer's sitting-room and bed-room, as well as the dispensary and a laboratory for bacteriological and pathological work. The remainder of the front portion of the ground floor is devoted to the accommodation of patients, separate day rooms being provided for male and female patients. Boot-rooms, patients' cloak-rooms, besides separate rooms for the nurse and servant, are provided on each floor, and the usual sanitary requirements are placed in disconnected and well ventilated turrets on the north side of the main corridor. Electric lifts are provided opposite each of the patients' staircases. On the north side of the main corridor, which is ten feet in width throughout its entire length, are the dining-hall and chapel, and in the rear, the kitchen, scullery, nurses' and servants dining-rooms and housekeeper's and general stores.

The first and second floors are planned to accommodate thirty-four patients on each (the sexes in equal proportions), arranged in rooms of various sizes; some containing six beds, some four beds, and the remainder single beds. In front of the single bed rooms balconies are provided enabling those patients who cannot enjoy exercise in the grounds to recline on couches. The windows throughout are of very large area and capable of being thrown completely open. *Liegehallen* of various shapes and sizes will be erected on the grounds. The nurses and servants will occupy a "home" at some distance from the main building and, in addition, there will be a laundry block, stables, a mortuary, and cottages for male servants. The whole of the buildings will be lighted by electricity, and the drainage will be on the bacterial-filter-bed system.

The acting staff of the Manchester Hospital of Consumption consists of three physicians, three assistant physicians, and two assistant medical officers. Drs. Ransome, Gamgee, and Simpson were among the members of the staff in the past; Drs. Hodgkinson, Moritz, and Hutton being the physicians at the present time, Drs. Haring, Fenn and Yonge the assistant physicians.

With regard to drugs and other modes of treatment, all methods which promised good results, or proved useful in the hands of others, have been and are carefully tested, but the greatest importance has always been attached to the supply of abundant fresh air, a liberal diet, and rest.

Thus, although an open-air treatment had always been in vogue at the hospital, the systematic open-air treatment, as carried out in the Continental sanatoria by means of lying-out in verandahs, together with an increased dietary, was only commenced in 1899.

In regard to the results obtained at the Bowdon Hospital, statistics can be given only for the last seven years, and are shown on the accompanying Table I.

From this it is seen that from 1894 to 1900 inclusive, 1057 cases of undoubted phthisis were treated, and of these there were:—383 much improved or cured, or 36·2 per cent.; 394 improved, or 37·3 per cent.; total improved, 73·5 per cent.; whilst 841 patients gained in weight, the average being 7·8 lbs. In the year 1900, when the verandah treatment was first carried out, 85·8 per cent. of the patients left improved, the average gain in weight being 9·5 lbs. (See Table II.).

The average cost per patient, which in the years 1889 to 1898 came to 16*s.* 2*d.* per head per week, rose in 1900 to 18*s.* 6*d.*; this increase being almost solely due to the enhanced cost of a more liberal diet, the cost for food having averaged in the preceding ten years 7*s.*, and in 1900 8*s.* 2*d.* per head per week.

As these notes have been prepared for presentation to the International Congress on Tuberculosis, all reference to the work of the hospital as it relates to diseases of the throat and chest, other than tubercular, has been intentionally omitted.

TABLE I.

Year.	Total Cases of Phthisis.	Cured or Much Improved.	Improved.	Stationary.	Worse.	Dead.	Number of Patients who gained Weight.	Average Gain in all, in lbs.
1894	153	58	66	7	19	3	121	6¾
1895	168	67	57	18	18	8	138	7½
1896	129	49	37	18	19	6	92	8
1897	191	82	65	12	25	7	156	7
1898	109	18	46	30	4	11	81	8
1899	145	47	52	25	14	7	113	8
1900*	162	62	71	12	14	3	140	9½
7 years	1057	383	394	122	113	45	841	7·8

* Systematic outdoor treatment.

TABLE II.—PARTICULARS OF 141 PHTHISICAL PATIENTS WHO, DURING 1900, HAVE LEFT THE HOSPITAL AFTER HAVING BEEN PART OR THE WHOLE OF THEIR STAY UNDER THE VERANDAH TREATMENT AND THE IMPROVED DIETARY.

Stage of Disease on Admission.	Number of Cases.	Number of Patients. *a* Improved.	*b* Stationary.	*c* Worse.	Stay in Hospital of 127 Cases under *a* and *b*. Total days.	Average days.	Gain in Weight of Cases under *a* and *b*. Total lbs.	Average lbs.	Number of Patients who Gained in Weight. Over. Lbs. 20.	From. Lbs. 15 to 20.	From. Lbs. 10 to 15.	From. Lbs. 5 to 10.	Up to. Lbs. 5.
I.	22	22	...	...	1479	67	261	11·87	1	4	10	5	2
II.	84	77	2	5	6742	85·3	726½	9·19	4	8	27	25	15
III.	35	22	4	9	2256	86·8	222¾	7·4	...	3	6	8	9
Total	141	121	6	14	10477	82·5	1210	9·5	5	15	43	38	26
Percentage	Year 1900	85·8	4·2	10	...	...	...	9·6	...	...	...	...	...
Do.	Year 1899	68·3	17·9	14·6	...	...	...	8	...	...	...	...	...
Do.	Year 1898	58·7	27·5	13·8	...	...	...	8	...	...	...	...	...

The rule of the hospital is that patients are to be discharged after three months' treatment. This arises from the small number of beds.

SUR LE FONCTIONNEMENT EN FRANCE DES DISPENSAIRES ANTI-TUBERCULEUX.

PAR M. LE DR. BONNET LEON, *de Paris.*

MONSIEUR LE PRÉSIDENT, MESDAMES, MESSIEURS, — J'ai l'honneur de soumettre au Congrès une communication relative à l'histoire et au fonctionnement en France de "l'Œuvre Générale des Dispensaires Anti-tuberculeux."

Cette communication sera brève et ne portera que sur des faits positifs.

Vous savez combien grands sont actuellement les ravages causés en France par la tuberculose pulmonaire. Plus de 150,000 décès sont actuellement dus à ce fléau, qui devient un péril national.

Il était urgent d'adopter un moyen de combat rapide.

Puisque l'accord du monde médical était fait au double point de vue de la prophylaxie et de la curabilité de la tuberculose, après les immortelles découvertes de Villemin, de Lister, de Pasteur, et de Koch, il fallait passer de la théorie à la pratique.

L'Angleterre et l'Allemagne nous avaient tracé un programme très net :

Nous devions d'abord, nous autres médecins, apprendre à la foule ignorante et surtout à la classe laborieuse, la plus atteinte en raison de son milieu misérable, que la tuberculose est contagieuse, qu'elle est évitable par des précautions hygiéniques assez simples. Il s'agissait, en un mot, de répandre l'éducation anti-tuberculeuse.

Nous devions ensuite, sachant que le mal est curable, notamment au début, rechercher les sujets encore peu atteints, non seulement les examiner et les soigner gratuitement, mais encore les assister au besoin, en leur fournissant surtout des aliments, sans lesquels, dans l'état actuel de la science, aucune médication connue ne peut être efficace.

Pour atteindre ce triple but d'éducation, de traitement et d'assistance, une forme d'action simple et conforme aux habitudes de notre pays, pratique, en un mot, s'imposait.

Penétré de ces principes, le premier en France, j'ouvris, au mois de janvier 1900, rue St. Lazare, à Paris, sous le nom de dispensaire anti-tuberculeux, une clinique gratuite pour les travailleurs du quartier. Je leur enseignai, pour combattre victorieusement la tuberculose, les mesures à prendre contre l'alcoolisme, la mauvaise alimentation, les logements insalubres, les crachats desséchés ; je leur fis comprendre la nécessité des examens précoces et leur donnai des habitudes d'aération et de suralimentation. Aidé par quelques personnes charitables, je vis les résultats dépasser mon attente.

Dès le mois d'avril 1900 deux journaux, *L'Echo du Public*, édité par Chamuel, et la *Revue des Découvertes Modernes*, publièrent régulièrement les

comptes—endus de cette tentative. Au mois de mai de la même année, ils annoncèrent la fondation de l'œuvre des dispensaires anti-tuberculeux, destinée à ouvrir dans chaque quartier de Paris et dans chaque agglomération ouvrière de province des établissements philanthropiques similaires afin de favoriser la préservation et la guérison de la tuberculose, au centre même des foyers de contagion.

L'exemple était suivi.

Au mois de juillet, à Liège, le Dr. Malvoz créait un dispensaire analogue dans son laboratoire.

Au début de l'année suivante, en 1901, la Commission extra-parlementaire de la Tuberculose, dans la publication de ses conclusions, approuvait la proposition du Dr. Calmette, de Lille, sur le projet d'organisation de dispensaires anti-tuberculeux avec le même programme.

Aucune autre publication, à ma connaissance, n'avait été faite sur un établissement anti-tuberculeux avant celle de *L'Echo du Public* relatant en détail le fonctionnement du dispensaire de la rue St. Lazare.

Je suis donc heureux de m'être rencontré sur ce terrain avec le distingué directeur de l'Institut Pasteur de Lille, qui se préoccupait aussi de cette question.

Vous avez entendu, messieurs, le rapport sur le dispensaire le Lille qui, ouvert en février, 1901, dans les salles de l'Institut Pasteur, va prochainement être installé dans un local approprié à son but.

Le dispensaire de la rue St. Lazare, à fin de bail, fut transféré, à cette époque même, dans un quartier plus populeux et plus contaminé, à Montmartre, 115, rue Marcadet. Un comité local de souscripteurs, comprenant bien qu'en semblable matière tout le monde est solidaire, se constitua rapidement et me permit d'assister les malades les plus nécessiteux.

Le doyen de la Faculté de Médecine, M. le Professeur Brouardel, devant l'indiscutable autorité duquel chacun s'incline, vint inaugurer officiellement le Dispensaire anti-tuberculeux de Montmartre le 31 mai suivant. Il le trouva en pleine prospérité et à son maximum de développement.

L'œuvre générale, patronnée par de hautes personnalités scientifiques telles que MM. les Drs. Brouardel, Landouzy, Chantemesse, Émile Roux, Calmette, et par des hommes politiques comme MM. Charles Dupuy, Léon Bourgeois, Siegfried, les préfets de la Seine et de police, les Présidents du Conseil général et municipal, etc., etc., prit en quelques semaines un développement considérable. L'initiative privée de Montmartre fut suivie et provoqua la formation, tant à Paris qu'en province, de plusieurs dispensaires anti-tuberculeux. Celui de Nantes, notamment, sous l'habile direction de M. le Dr. Chachereau, fonctionne avec succès depuis près de deux mois. Angoulême et Dijon envoient également leur adhésion et les 1er, 2e, 4e, 5e, 14e, 15e arrondissements de Paris vont incessamment ouvrir de semblables établissements avec l'appui et sous le patronage de l'œuvre générale des dispensaires anti-tuberculeux.

Un grand mouvement se dessine en France en faveur de ce nouveau moyen de lutte. Signalons encore une œuvre analogue à la nôtre, "l'œuvre

de la tuberculose humaine," qui sous une direction différente adopte le même programme et ouvre un dispensaire à Paris.

Le fonctionnement du dispensaire anti-tuberculeux a déjà donné, en effet, des résultats très satisfaisants.

Permettez-moi, messieurs, de vous exposer, en quelques mots, le fonctionnement du dispensaire de Montmartre qui, basé sur l'expérience déjà ancienne de celui de la rue St. Lazare, installé définitivement dès son ouverture dans un local convenable, ayant admis dans les trois premiers mois plus de 600 malades, peut et doit être pris comme type de dispensaire anti-tuberculeux en ce moment.

Situé au centre d'un quartier bien délimité, au rez-de-chaussée dans une rue tranquille, le dispensaire occupe un local modeste de six pièces et comprend une grande salle d'attente pour 100 ou 150 personnes, un cabinet médical, une salle pour inhalations et gymnastique respiratoire, une chambre noire pour l'examen par les Rayons Roentgen, un vestiaire et un sous-sol. Les murs silicatés et les dallages sont soumis à des irrigations et des lavages antiseptiques.

Le mobilier très simple est également facile à désinfecter.

Le matériel se compose d'instruments pour le diagnostic et le traitement de la tuberculose, microscope, appareils de radioscopie et radiographie, balances pour peser les malades, crachoirs hygiéniques, presses à viande, glacière pour les produits alimentaires destinés à l'assistance.

On a adopté l'éclairage électrique.

Les frais de première installation sont évalués à 5,000 francs environ.

Le plan et les schémas de ce dispensaire figurent au Musée du Congrès dans l'exposition de M. le Professeur Landouzy.

Deux médecins avec un chef de clinique et deux aides suffisent à assurer le service médical et administratif.

Les heures de consultation et de traitement ont été fixées aux heures de sortie des ateliers et bureaux.

Chaque nouveau malade, venant au dispensaire, dont l'entrée est absolument libre, donne son nom et son adresse, qui sont consignés sur un registre spécial A, restant, pour éviter la divulgation du secret professionnel, entre les mains du médecin directeur.

Une carte portant au recto un numéro d'ordre et au verso des conseils anti-tuberculeux est remise au malade.

Les diagnostic, prognostic, traitement, ainsi que les antécédents héréditaires ou personnels, les renseignements sur le logement, le métier, les ressources, sont insérés en regard du numéro sur un deuxième registre B. Ce registre B est consulté à chaque nouvel examen du malade, qui a lieu régulièrement tous les 10 jours. On y consigne en outre les observations et résultats de l'enquête sur les logements confiée à des employés spéciaux.

Un 3e registre C est destiné aux malades complètement assistés, c'est-à-dire recevant des médicaments, des aliments, des secours pour leur famille.

Dès le premier mois de son ouverture, le Dispensaire de Montmartre a reçu 100 nouveaux malades et en a soigné 50 environ par jour.

Dès le deuxième mois le nombre des nouveaux atteignait 400 et celui des traités dépassait 100 par jour.

Le maximum était dès lors atteint et depuis il se maintient régulièrement, même pendant les mois d'été.

Ces chiffres et cette progression permettent d'établir que, dans une année, le dispensaire de quartier peut :

1. Examiner 4,000 à 5,000 personnes et leur donner l'éducation anti-tuberculeuse.

2. Fournir des médicaments, soins et traitements à 400 ou 500 malades, par séries de 100 ou 125 venant au dispensaire chaque jour pendant trois mois.

3. Assister complètement 120 indigents ou travailleurs à qui du repos, des aliments, des secours sont procurés pendant 2 ou 3 mois. Les frais de cette dernière assistance sont évalués à 2 francs par jour et par malade. Ils atteignent de ce chef la somme de vingt-deux mille francs environ par an.

Le budget annuel du Dispensaire de quartier, basé sur le fonctionnement réel du Dispensaire anti-tuberculeux de Montmartre, se précise de la façon suivante :

Loyer, entretien, traitement du personnel, indemnité aux médecins; au dispensaire de Montmartre le service medical est fait gratuitement	8,000 francs.
Assistance en désinfectants, crachoirs, médicaments, aliments, secours	22,000 francs.
Total . .	30,000 francs.

On voit que la somme nécessaire est peu élevée relativement aux résultats obtenus.

Ajoutons que le fonctionnement du Dispensaire de Montmartre a donné lieu à quelques remarques très importantes.

A.—Sur 100 malades qui se sont présentés le 1er mois,
50 étaient arrivés à la 3e période du mal,
40 environ à la 2e,
10 seulement à la 1ère.

Mais dès le 2e mois cette proportion était inversée :
50 % à la 1ère période,
40 % à la 2e,
10 % à la 3e.

Ainsi se trouvait remplie une partie très importante du programme anti-tuberculeux. Ce résultat est dû au titre du Dispensaire, à sa situation au centre d'un quartier, à l'éducation de l'opinion publique, à la haute autorité du comité général de patronage et à l'emploi des Rayons de Roentgen qui permettent le diagnostic très précoce de la maladie.

B.—La dénomination de "Dispensaire anti-tuberculeux" pour la préservation et la guérison de la tuberculose pulmonaire, loin d'effrayer le public

comme on l'avait prétendu, a, tout au contraire, déterminé à elle seule un grand nombre de personnes à venir consulter ou demander des renseignements.

C.—Dans un dispensaire de quartier, où les malades se rendent facilement et d'une manière régulière, le médicin agit très efficacement sur l'opinion publique. Ses conseils font contracter des habitudes de prophylaxie. Aucun autre moyen, ni la presse, ni les conférences ne valent cette "leçon de choses" pour éclairer le public et le mettre en garde contre la tuberculose. Ainsi, à Montmartre, l'expérience le prouve, riches et pauvres ont appris la nécessité de se faire examiner de bonne heure et soigner convenablement. Le fait suivant le montre suffisamment: Les médecins du quartier redoutaient à l'origine la création d'un dispensaire au point de vue de leurs intérêts professionnels; ils ont vite reconnu leur erreur en voyant leurs malades tuberculeux devenir plus nombreux et plus assidus à mesure que le dispensaire progressait et répandait l'instruction dans son entourage.

D.—Enfin nous avons constaté l'utilité d'une installation de Rayons Roentgen. Leur emploi pour le diagnostic précoce fait l'objet d'une communication à la Section II du Congrès. C'est eux qui dès 1899 nous donnèrent l'idée de créer un dispensaire pour rechercher les tuberculeux au début de l'invasion morbide, et nous conduisèrent à la création du 1er dispensaire anti-tuberculeux avec une conception différente de celle de la polyclinique allemande.

Cette nouvelle méthode permet en outre de comprendre aisément par l'inspection du jeu du diaphragme et des muscles inspirateurs le mécanisme curateur de la gymnastique respiratoire, qui nous a déjà donné d'excellents résultats, dans la cure de la tuberculose. Pour terminer, présentons quelques chiffres dont la brutalité montrera plus nettement encore les avantages du système de défense par les dispensaires.

Chaque année, en France, cent mille ouvriers environ ne peuvent continuer leur travail ou meurent par suite de tuberculose. Ils occasionnent au pays une perte de deux cents millions, en évaluant à 4 francs leur salaire quotidien et en tenant compte des secours à donner à leur famille.

Si l'on adoptait, pour faire soigner ces malheureux et atténuer les pertes de la France le système des sanatoriums, il faudrait construire 250 sanatoriums. Chacun d'eux coûtant 300,000 francs environ de construction et 300,000 francs d'entretien annuel, on devrait donc dépenser 75,000,000 de 1ère installation et 75,000,000 d'entretien chaque année.

Il est inutile de faire remarquer que la construction de ces établissements exigerait un temps très long, pendant lequel la contagion s'étendrait encore.

En choisissant, au contraire, le système des dispensaires, il est facile de créer très rapidement 250 dispensaires.

Les frais de leur installation totale reviendront à 1,250,000 francs seulement, et leur entretien total annuel n'excédera pas 7,500,000 francs.

Pour ces chiffres relativement abordables, on procurera des consultations médicales et l'éducation anti-tuberculeuse si nécessaire à plus d'un million de personnes.

On donnera des soins à plus de cent mille malades, traités chaque jour pendant un trimestre.

On assistera complètement trente mille indigents, recevant le repos, la suralimentation, et des secours pendant un trimestre également.

Cette comparaison entre les sanatoriums et les dispensaires n'implique pas, comme conclusion, l'abandon des sanatoriums. Ces derniers seront en quelque sorte le prolongement des premiers qui leur choisiront les malades curables.

Après quelques années de fonctionnement, les dispensaires feront surtout œuvre de préservation.

Actuellement ils ne représentent pas une mesure hâtive ou insuffisante, comme on l'avait cru.

Les résultats des dispensaires de la rue St. Lazare et de Montmartre sont très satisfaisants au double point de vue prophylactique et curatif. Ils nous autorisent à conclure à l'organisation rapide, dans chaque foyer contaminé, d'un dispensaire anti-tuberculeux de quartier, comme celui de Montmartre.

Le groupement de tous ces dispensaires ne tardera pas à améliorer les conditions sociales du pays.

L'avenir de la France et celui des autres nations, actuellement sans défense suffisante contre la tuberculose, paraît lié au fonctionnement du système des dispensaires anti-tuberculeux.

Il est à souhaiter que les pouvoirs publics et les municipalités organisent ou facilitent l'extension de ce moyen éminemment pratique de lutte contre la tuberculose.

THE CO-OPERATION OF CHEST HOSPITALS AND SANATORIA.

By Dr. D. R. MURRAY LESLIE, *London.*

I would submit that the institution of free sanatoria on a large scale should be carried out in co-operation with the already existing chest hospitals. The open-air treatment of consumption has undoubtedly dealt a blow at the existing system of herding together cases of tuberculosis in city hospitals, where they cannot possibly secure the requisite amount of fresh air which is so imperative in these cases. This fact is quite sufficiently realised by the profession at large; but there is another factor which, in my opinion, has not been made sufficiently prominent. The Metropolitan chest hospitals, by virtue of their position, command—and always will command—the best possible medical experts on their staffs. This cannot be said of practically any of the consumption sanatoria, which, in the nature of the case, cannot be officered by the best men, who will always congregate in the Metropolis and larger cities. I should like, therefore, to suggest that in the interests of consumptive patients, every City chest hospital should have its own sanatorium in the country as an integral part of that hospital, and that one or more of the

physicians should visit the sanatorium at least once a week and overlook the work of the sanatorium officers. With the present means of railway communication, such a course would be perfectly feasible; as it is, a visit to a chest hospital in the City generally takes up an afternoon which could quite as well be spent in the country. These country visits could be taken by the physicians in turn. The question of railway expenses is a very minor matter, and could be defrayed by the hospital authorities or the Charity Commissioners, if necessary. Many suitable sites for sanatoria could be found within one or two hours' journey from London. Personally, I think there would be very few members of the active staffs who would refuse to undertake this duty.

It has been said that it would be better to have simply out-patient departments in London and the great cities, from which to draft the patients to the respective sanatoriums. Personally, I dissent from this view entirely: each case ought to be thoroughly examined clinically for two or three weeks in the wards of the hospital; the pulse, temperature, and respiration charts carefully observed, the symptoms and progress of the case recorded, etc., after which time it will then become possible to judge as to which cases are suitable or unsuitable for sanatorium treatment. Speaking myself as an out-patient physician at one of these hospitals, I do not think it is possible in the majority of out-patient cases to come to a satisfactory conclusion as to the progress of a case, which may be under the most unfavourable conditions at home, preventing its reacting to medicinal or other treatment. This would inevitably lead to many cases being discarded as unfit for sanatorium treatment which might, in reality, be most suitable. Further, it must not be forgotten that chest hospitals in cities must always be necessary for the treatment of cardiac and non-tubercular pulmonary cases, and therefore it would be most unwise not to utilise these hospitals as half-way houses for sifting out those cases which are most likely to become arrested by open-air treatment, and that too by the best medical expert advice that can be obtained. By combining this sifting process with periodical visiting of the sanatoriums themselves by these experts, the best results for the patients and for the community would, in my opinion, result. It seems to me that the utilising of the present staffs of the various chest hospitals would be a very much better method than the furnishing by the Charity Commissioners or other bodies of sanatoria to be officered by men chosen by these bodies.

"ERHOLUNGSSTÄTTEN."

By WOLF BECHER, *Berlin*, and Dr. RUDOLF LENNHOFF, *Berlin*.

Only a small number of consumptive patients can be admitted into sanatoria. Many who are to be admitted have to wait so long that in the meantime the disease becomes serious. Scarcely anything is done for such patients, who cannot be admitted into sanatoria. Those discharged from sanatoria in many cases recommence work too quickly, instead of passing

through an intermediate stage. The "Erholungsstätten" serve a useful purpose in all these cases.

The State, municipalities, or private owners place a piece of forest land near large centres of population at the disposal of the institution. This land is wired in.

Arrangement.—Döcker's barrack, with kitchen, office, room with one or two beds for urgent cases, until removal into a hospital. A hall, quite open on one side, for bad weather. Folding chairs are provided and games are encouraged.

The patients travel there in the morning and return to their own home at night. They receive milk, dinner, and other food.

In Germany most of the people in question are insured against sickness (by *Krankenkassen*). These *Krankenkassen* provide support towards maintenance of families, payment of railway fares, and cost of milk and dinner (in Berlin 9*d.* to 10*d.* per day).

A medical man superintends the institution, but every patient remains under the treatment of his own doctor. The institution is under the management of a nurse. There are also a cook, a scullery-maid, and a night watchman. The institution makes a profit upon the sale of the milk, which suffices to pay the nurse and the servants.

The prime cost of the whole institution is only about 6,000 to 7,000 marks (but if, as in Berlin, the "Red Cross" lends the Döcker's barracks, the cost only amounts to 3,000 to 4,000 marks).

In order to test the practicability of our scheme, the German "Red Cross" in the summer of 1900 established the first Erholungsstätte (for men only) in the Jungfernhaide, a forest near Berlin. In consequence of the good results of the first year's working, this summer the "Red Cross" established four Erholungsstätten, two for men and two for women, each for 150 patients. Large manufactories (for their own workmen only) and other towns have also followed suit.

M. le Dr. BARBARY, *de Nice.*

Les découvertes de la science sont enfin venues arracher l'humanité au fatalisme qui l'immobilisait devant le spectacle de cette hécatombe sans cesse renouvelée. Partout la lutte s'engage: ici ce sont les sanatoriums qui recueillent les tuberculeux, leur assurent les soins nécessaires, les rendent souvent à la vie, toujours à l'espérance; là ce sont les œuvres qui, s'attaquant à l'origine même du mal, ont pour objectif de préserver de la contagion tous ces êtres encore pleins de jeunesse et de vie qui, si l'on n'y prend garde, seront les tuberculeux de demain, ce sont les œuvres qui cherchent à tarir la source d'où découle chaque année, dans notre seule France, ce flot débordant de plus de 150,000 tuberculeux.

La Société de préservation contre la Tuberculose par l'éducation populaire s'est assigné la tâche de faire pénétrer dans l'esprit des masses un petit nombre de notions indispensables. Apprendre aux grands comme aux petits l'étendue des ravages causés par la phtisie, faire savoir à tous que le mal se

communique surtout par les germes mélangés aux poussières banales des rues et des maisons, faire comprendre qu'il suffirait de détruire ces germes pour éteindre le fléau, voilà ce que veut notre Société !

Lorsque ces données seront familières à tous, lorsque chacun sera pénétré de cette idée que le tuberculeux qui crache par terre s'expose à devenir le meurtrier de sa femme, de ses enfants, de ses voisins, on aura créé un état d'esprit qui rendra facile l'application des mesures que réclament à la fois l'hygiène publique et l'hygiène privée. Alors seulement les règlements qui seront édictés rendront leur plein effet, car les meilleures lois restent inappliquées lorsqu'elles ne concordent pas avec les aspirations et les habitudes du public.

Or, modifier les mœurs n'est pas l'affaire d'un moment : des efforts patients, continus, sont nécessaires ; il faut frapper à coups redoublés pour se faire entendre : nous ne manquerons pas de le faire.

Nous ne craindrons pas d'agir par obsession : tous les procédés de la réclame nous seront bons ; larges distributions de circulaires, brochures, cartes postales, images, affichage d'instructions, organisation de conférences, etc., etc.

Déjà nous pouvons compter sur de précieuses collaborations, mais notre action ne sera réellement puissante que lorsque nous aurons rallié à notre cause un nombre assez imposant de concours pour créer un véritable courant d'opinion.

DU RÔLE DES DISPENSAIRES ANTI-TUBERCULEUX DANS LES GRANDS CENTRES.

PAR MM. LES DRS. SAMUEL BERNHEIM ET TABARY, *Paris.*

A l'heure où le lutte contre la tuberculose paraît s'organiser, où le public commence à comprendre le péril social que fait courir à l'humanité la phtisie, nous venons vous présenter l'œuvre que nous avons tentée à Paris avec l'aide de quelques confrères et l'appui de quelques philanthropes.

Dans plusieurs arrondissements de Paris, et nous ésperons qu'il en sera bientôt dans tous, nous avons établi des dispensaires comprenant un local, composé de 4 pièces, salle d'attente, salle de consultations, salle de distributions de médicaments et d'aliments, laboratoire. Ces salles sont, bien entendu, conformes aux meilleures règles de l'hygiène moderne. Sur les murs nous avons fait inscrire les grands principes de la prophylaxie anti-tuberculeux, dont nous reproduisons ces quelques preceptes.

A.—*Instructions contre la tuberculose.*

1°. La tuberculose est la maladie la plus repandue.

2°. La tuberculose est inévitable, la tuberculose est générale.

3°. Si la tuberculose est si commune, c'est qu'elle est propagée par les crachats du malade.

On évite la tuberculose en faisant la guerre aux crachats.

Le malade doit à domicile ne cracher que dans un crachoir toujours

pourvu d'une certaine quantité de liquide : il doit, au dehors, à défaut de crachoir, ne cracher que dans un mouchoir.

Tout crachat tombée sur le sol (parquet, tapis, paillasson, trottoir, voiture, wagons, etc.) répand la tuberculose.

Autant de crachats détruits autant de tuberculoses évitées.

4°. Le crachoir devra être nettoyé chaque jour en le mettant dans de l'eau froide que l'on fera bouiller pendant cinq minutes.

Tout linge sur lequel on aura craché (mouchoir, serviette, etc.) devra, comme le crachoir, être plongé et maintenu cinq minutes dans l'eau bouillante ou soigneusement mis à part pour etre livré aux services publics de désinfection.

Chaque dispensaire est rattaché à un laboratoire central, où on contrôle l'examen des crachats et l'analyse des urines. Ce laboratoire est naturellement ouvert à tous le médecins qui veulent travailler ou y faire des recherches touchant la tuberculose.

Jusqu'ici c'est à la bienfaisance individuelle que nous devons nos ressources ; chaque malade ne nous coûte pas moins de 2 francs par jour. Grâce à des conférences, à des articles de journaux, nous avons pu jusqu'ici réunir les ressources nécessaires au bon fonctionnement de l'œuvre. Étant même donné l'entrain qu'on a mis à nous apporter l'obole utile à nos pauvres malades, nous pouvons dire que l'œuvre est éminemment populaire.

B.—*Organisations médicales.*

Au point de vue médical voici comment nous avons organisé l'œuvre. Un certain nombre de médecins se sont répartis les heures de consultations ; d'autres vont à domicile surveiller et les malades et les foyers d'infection signalés soit par les statistiques officielles, soit par les bonnes volontés. Aussitôt qu'un malade se présente au dispensaire, le médecin de service fait son examen médical, qu'il consigne soigneusement sur une fiche ; puis, aussi discrètement que possible, le médecin s'informe des moyens d'existence, de la situation matérielle afin de déterminer les secours que doit donner le dispensaire au malade. Il prie celui-ci de lui apporter à sa prochaine visite ses crachats et ses urines pour les soumettre à l'examen bactériologique et à l'analyse chimique. C'est là une besogne de laboratoire à laquelle nous attachons la plus grande importance, et que nous faisons systématiquement au début et en cours de traitement pour tous nos malades.

La consultation se termine par la prescription et l'ordonnance du médecin :

Prescription de médicaments qu'on va distribuer gratuitement au malade dans la salle voisine ; conseils d'hygiène, de régime, distribution d'aliments ou de secours, selon le cas. Enfin, pesée du malade, laquelle est répétée tous les 10 jours.

Le malade est soumis aussi à un traitement et à un régime dont on apprécie les effets à la fois par la pesée et par les examens bactériologiques et les analyses chimiques.

L'organisation « morale », complément nécessaire de l'organisation médicale. C'est elle qui fait l'originalité de nos dispensaires.—Telle est l'organisation médicale proprement dite.

Mais elle est inséparable de l'organisation morale, c'est-à-dire celle qui a en vue l'éducation, la surveillance du malade, le contrôle du traitement à domicile, la distribution des secours, etc.

Cette organisation morale est, selon nous, le complément nécessaire de la consultation médicale ; elle constitue, à nos yeux, la véritable originalité de nos dispensaires et leur haute utilité. . . .

C'est elle qu'il nous reste à exposer.

La cure de la tuberculose comporte, en effet, un traitement individuel, curatif, puisque la maladie est curable, et des prescriptions d'hygiène générale, de prophylaxie, puisque la maladie est évitable. Or, nos dispensaires poursuivent avec un égal souci ce double aspect de la question. Ils veulent guérir et prévenir à la fois.

Education et instruction du malade.—Pour cela, l'éducation médicale du malade, un certain degré d'instruction, de notions d'hygiène lui sont indispensables.

Cette éducation des malades, nous l'avons toujours en vue. Et au cours de leurs visites au dispensaire, dans la conversation que nous avons avec eux, nous ne manquons jamais de leur inculquer les principes essentiels de l'hygiène des tuberculeux, pour lui d'abord et aussi pour ceux qui l'entourent. Nous leur apprenons les précautions les plus élémentaires. Nous leur répétons ce qu'ils lisent sur nos murs, et nous leur montrons comment, avec un peu d'attention, de surveillance de soi-même et de précaution, on s'habitue vite à se soigner au milieu des siens, dans sa famille, sans être un danger pour son entourage.

Nous leur apprenons à respirer—ce que savent si peu de malades—qui utilisent si mal un champ d'hématose déjà rétréci. Nous leur apprenons surtout à tousser, ou plutôt à modérer leur toux, cette toux quinteuse, inutile, qui fatigue la poitrine en pure perte, quand elle n'aboutit pas à la débarrasser de crachats par l'expectoration. C'est là, selon nous, un point important de l'hygiène du tuberculeux. L'empêcher de tousser, en l'apprenant à résister à l'envie de tousser, c'est le mettre en état de reposer sa poitrine. La toux, quand elle est spasmodique, quinteuse, convulsive, ne permet pas le repos de l'organe malade, et l'on sait quelle importance nous attachons à cette cure de repos local et général.

Mais ce n'est là qu'une éducation individuelle, isolée, et nécessairement restreinte du malade en particulier.

Depuis longtemps, nous estimions que c'était insuffisant et qu'il importait, pour une prophylaxie efficace, de faire l'éducation de l'ensemble des malades, de la collectivité de la masse.

C'est pour cela que nous avons organisé des conférences populaires, des causeries sur l'hygiène et la tuberculose, où les médecins de nos Dispensaires, dans un langage simple, clair, facilement accessible à teus leurs auditeurs

ne se lassent pas de leur redire les grands principes de la prophylaxie de la maladie, de leur montrer comment il convient de les mettre en pratique, descendant dans le détail même de l'application, de leur répéter que la maladie est évitable, comment on doit l'éviter, qu'elle est curable, comment ils pourront s'en guérir.

En outre, l'organisation centrale publie de temps à autre des *tracts* qui, distribués gratuitement au public, lui enseignent comment on contracte la maladie, comment on s'en protège. L'image, l'affiche, la brochure, la conférence, etc. . . . . tous les moyens nous sont bons pour répandre dans le peuple cet enseignement.

Ainsi, par la parole, par l'écrit, nous faisons œuvre de prophylaxie et d'éducation populaire.

Les dispensaires doivent dépister la maladie à ses débuts et aller au devant de ses malades.—Mais pour que la prophylaxie soit complète, pour que le mal soit endigué et soigné à son début, il ne suffit pas de recevoir le malade, d'attendre sa visite, il faut encore aller au devant de lui, *dépister* la maladie partout où elle se cache.

C'est là une œuvre de pratique médicale délicate, qui réclame beaucoup de tact, mais dont l'utilité a été bien mise en lumière par M. le docteur Calmette, directeur de l'Institut Pasteur, à Lille, dans un excellent rapport sur la nécessité de créer des *Dispensaires anti-tuberculeux.*

"Je pense, dit-il, que, au lieu d'attendre que l'ouvrier tuberculeux aille consulter le médecin et soit acculé au chômage, on devrait ériger en principe la nécessité d'*aller à lui* et de lui prêter assistance avant même qu'il puisse s'apercevoir qu'il est gravement atteint. Je voudrais qu'on pût *dépister*, chez le malade, la tuberculose tout au début de son évolution et qu'on s'efforçât aussitôt de lui donner les conseils et les soins qui peuvent lui être utiles, en le conservant le plus souvent à sa famille et à son milieu."

C'est précisément le désidératum que nous avons réalisé avec notre organisation. Dans les quartiers industriels où fonctionnent beaucoup d'usines et d'ateliers, nos collaborateurs se mettent en rapport avec les directeurs, les contre-maîtres, les chefs d'équipe de ces établissements, qui leur signalent les ouvriers suspects de tuberculose. Nous les attirons au dispensaire pour les examiner, les soigner au début de leur mal, et nous leur distribuons, si nous jugeons utile qu'ils suspendent pour un temps leur travail, des secours en nature ou en espèces, des vêtements, des médicaments, des aliments, poudre de viande, œufs, lait, beurre, etc.

Dans la mesure où nos ressources nous le permettent, nous en envoyons quelques-uns à la campagne. A ceux dont la profession était trop pénible pour leur forces, nous donnons le moyen de trouver un métier plus conforme à leur état de santé.

Quand la misère est trop grande, ce qui arrive dans certaines familles très nombreuses, nous signalons ces infortunes à quelques-uns de nos généreux donateurs qui apportent le soulagement et la consolation dans ces foyers déshérités.

Surveillance des malades. Contrôle du traitement.—Il ne suffit pas de découvrir le malade, de dépister la maladie à son début, il faut encore, puisque nous laissons nos malades à leur famille, nous assurer que nos conseils y sont suivis et le traitement appliqué. Il appartient aux dispensaires d'exercer une surveillance et un contrôle sur leurs malades.

Nos médecins vont donc à domicile visiter leurs malades; ils tiennent la main à ce que les prescriptions hygiéniques soient observées, le traitement suivi, dressent le casier sanitaire de ces maisons maudites où règne en maître le bacille de Koch, signalent aux services de la désinfection municipale les appartements souillés et dangereux.

Surveillance et contrôle nécessaire qui donnent beaucoup de mal à nos médecins, mais qui représentent la discipline indispensable au succès de tout traitement.

L'organisation de chaque dispensaire est autonome.—Telle est l'organisation de nos dispensaires au triple point de vue matériel, médical et moral.

Ajoutons que l'organisation de chaque dispensaire est autonome. La plus grande liberté est laissée aux médecins traitants dans le choix des moyens d'actions qu'ils croient les meilleurs pour combattre la maladie. Nous n'imposons de méthode thérapeutique à personne. Nous sommes même heureux de provoquer l'initiative des jeunes et de comparer nos essais, d'en mesurer la valeur aux résultats qu'ils nous donnent.

Chaque dispensaire est seulement sous la direction morale d'un comité d'arrondissement composé des hommes notables de quartier, qui s'occupent de la rentrée des fonds et s'intéressent d'avantage aux malades qu'ils connaissent.

Qu'il soit bien entendu, d'ailleurs, que les dispensaires ne peuvent être une concurrence pour les médecins du quartier. Nous ne donnons des soins qu'aux indigents, c'est-à-dire à ceux qui représentent une perte sèche pour le médecin du quartier. Le praticien qui exerce dans un arrondissement populeux se trouve tous les jours en face de misères sans nom. Et tout le premier, il est heureux d'adresser de tels malades aux dispensaires, où il voit qu'on pourra les améliorer et peut-être les guérir.

Resultats acquis à ce jour.—Quels résultats nous ont donnés à ce jour les dispensaires antituberculeux ?

L'expérience est de date récente, puisqu'elle remonte au commencement de l'année, mais déjà nous pouvons en apprécier l'utilité et les bienfaits.

Depuis la fondation, c'est en moyenne à 50 malades par jour que nos médecins donnent leurs soins. Au début, nous n'étions visités que par les plus malades, ceux qui avaient traîné leur mal dans tous les hôpitaux, et qui, désabusés, découragés, abandonnés des médecins et s'abandonnant eux-mêmes, venaient sans espoir, sans confiance, avec le scepticisme du malade qui ne s'en laisse plus convaincre, consulter nos dispensaires "parce que c'était nouveau." Mauvais cas, on le reconnaîtra, que ceux-là, et début difficile pour une œuvre comme la nôtre; mais peu à peu, nous avons eu affaire à des malades un peu moins compromis et nous sommes heureux

de travailler aujourd'hui sur un meilleur terrain. Nous espérons qu'à l'avenir, grâce à la réputation de l'œuvre, nous aurons surtout des tuberculeux et non des phtisiques, des consomptifs à soigner.

D'une façon générale, les malades qui nous visitent peuvent être groupés en trois catégories :

1° Les sujets atteints au premier ou au deuxième degré, mais dont le terrain est encore résistant et l'état de conservation presque intact.

Nous les guérissons presque tous sur place, le traitement même est généralement assez rapide. Un trimestre y suffit.

2° Le malade du premier et du deuxième degré dont l'organisme est précocement déprimé et où l'infection se greffe sur un mauvais terrain. Ceux-là ont beaucoup moins de chance de guérison, nous ne pouvons guère que les améliorer.

3° Enfin, les phtisiques avancés au deuxième et troisième degré, qu'on ne réussit qu'à soulager momentanément, mais qu'on empêche du moins d'être des sujets dangereux pour leur entourage.

C'est là une impression d'ensemble sur une expérience encore récente, mais qui ne peut, avec le temps, que se perfectionner et donner des résultats de plus en plus encourageants.

Nous avons plaisir, d'ailleurs, à reconnaître que notre œuvre a été accueillie très favorablement et qu'elle est secondée par la bienveillance de l'opinion publique, l'empressement des malades, et la générosité des philanthropes, qui mettent, à employer noblement leur fortune, leur intelligence et leur cœur.

Sanatorium-Dispensaire.

Que l'on ne croit pas que notre œuvre soit, comme on l'a dit, une concurence aux sanatoria. Ayant le même but, c'est-à-dire, la lutte contre la tuberculose dans la classe indigente, ces deux œuvres sont et doivent toujours être le corollaire l'un de l'autre.

Mais tandis que les sanatoria coûtent très chers, les dispensaires reviennent relativement à bon marché. Et puis, pour établir les sanatoria, pour habituer les malades de s'y rendre c'est 20 ans, 30 ans qu'il faut, c'est toute une éducation à faire, ce sont des lieux spéciaux à choisir loin des agglomérations, des centres urbains, tandis que le dispensaire, poste-vigie établie près du danger, au milieu du foyer, peut s'établir partout et immédiatement.

L'un et l'autre ne s'adressent point cependant aux mêmes malades ; aux sanatoria, ce sont exclusivement les phtisiques au début qu'il faut, tandis que tous sans exception depuis le premier jusqu'au 3e degré peuvent bénéficier du dispensaire.

D'autre part, tandis que le sanatorium ne s'adresse qu'à un petit nombre, au contraire le dispensaire mène le bon combat de plus haut et pour l'individu lui-même, et pour sa famille, et dans la société.

L'œuvre doit se généraliser et s'étendre.—La réputation de notre œuvre est arrivée jusqu'en province, jusqu'à l'étranger, où plusieurs de nos confrères

projettent, après nous avoir consultés, de fonder des établissements sur les données des nôtres.

Nous estimons, en effet, que des dispensaires peuvent être créés du jour au lendemain dans les grands centres et à peu de frais, qu'ils sont susceptibles de rendre les plus grands services et de secourir la province dans la lutte pratique contre la tuberculose.

Grâce à une organisation analogue à celle que nous venons d'esquisser, ils pourront s'occuper des milliers de tuberculeux négligés jusqu'à ce jour, et qui, secourus à temps, sont capables de guérir. Les dispensaires exerceront toujours une influence décisive sur la prophylaxie de la tuberculose. Le phtisique, surveillé, instruit, soigné, dirigé, soutenu par l'œuvre, ne sera plus un danger pour la santé publique.

Ces institutions, répandues sur tout le territoire, deviendront des centres d'observation clinique, d'enseignements et de recherches thérapeutiques.

A quelque point de vue qu'on se place, pitié individuelle, charité sociale, hygiène et prophylaxie générale, salut des malades, sauvegarde de la collectivité, les dispensaires anti-tuberculeux font œuvre belle et utile et sont dignes de la confiance et des hautes protections qui les soutiennent dans leur lutte contre l'ennemi commun.

The following expression of opinion was handed to the President at the close of the proceedings, but time did not allow the expression to be submitted in the form of a resolution :—

> "We wish, without in any way prejudicing the *rôle* which the sanatorium must play in the battle against consumption, to urge upon governments, local sanitary authorities, poor law authorities, and charity organisations the necessity of encouraging the institution of anti-tuberculous dispensaries as the best means of struggling against tuberculosis in the working classes."

Signed by

Professor CALMETTE.
Professor LANDOUZY.
Professor LÉTULLE.

RAPPORT SUR LA COLONIE AGRICOLE DU CANNET POUR ADULTES (INDIGENTS) CONVALESCENTS DE TUBERCULOSE PULMONAIRE.

PAR M. LE DR. VAUDREMER.

ule crétacé, c'est à dire guéri, se rencontre très fréquemment dans ut es hospitalières. Ce fait les statistiques le démontrent depuis trente ans et plus chez des individus de toutes conditions.

En examinant ce résultat on peut poser deux conclusions des plus importantes : la guérison possible de la tuberculose sur certains terrains sans amendement particulier de ceux-ci et sans traitement spécial pour les protéger du mal qui les a envahis, en second lieu, la certitude de guérisons plus nombreuses et plus rapides, si les malades avaient pu être placés dans les règles requises qui commencent à être bien connues actuellement.

Il est vrai que dans la plupart des cas le mal avait été méconnu. Découvertes d'autopsie, les lésions tuberculeuses rencontrées ainsi avaient évolué à l'insu des malades appartenant à une catégorie d'individus s'observant peu, et, n'écoutant que d'une façon très relative les conseils du médecin, si tant est qu'ils en aient consulté un.

Mais à côté de ces faits ignorés, on rencontrait jusqu'à ces dernières années, dans les consultations externes des hôpitaux de Paris, par exemple, des tuberculeux au début dont on diagnostiquait les lésions, qu'on faisait revenir de temps en temps, auxquels on donnait un peu d'arsenic et de créosote, auxquels on pratiquait à chaque consultation une série de pointes de feu, et, qu'on traînait ainsi, en leur permettant de prolonger un peu leur travail et, par suite, d'éloigner l'heure de la misère.

Si nous parlons au passé, c'est qu'en quelques années, la question a changé, et que, d'ici peu, un ensemble de mesures pratiques l'aura, de fond en comble, modifiée. Mais ce passé qui paraît s'éloigner à grands pas n'en est pas moins encore tout près de nous, et, force était de le rappeler, pour expliquer la genèse de la colonie agricole dont il va être question plus loin.

En pénétrant plus avant dans les conditions d'existence de ces tuberculeux, en les interrogeant, on constatait, d'une façon habituelle, que les hommes atteints faisaient abus d'alcool, que les femmes travaillaient toute la journée dans des ateliers encombrés ; que les nuits ne leur étaient pas accordées complètes, et que des heures de veille leur étaient en général imposées. De toutes ces constatations se dégageait cette idée d'ensemble : c'est que, l'œuvre définitivement utile à mettre en valeur dans le traitement de ces malades, était leur transplantation au grand air et un changement de profession. Le but à poursuivre était d'ordre psycho-physiologique. Il fallait traiter l'esprit et le corps, il fallait faire œuvre de médecin et œuvre de moraliste, envisager, au point de vue moral, la suppression du cabaret, la suppression des tentations rencontrées à chaque pas à la ville, la suppression des promiscuités, la fin d'un surmenage absurde et fatal ; au point de

vue physique, la suppression de l'encombrement, la distribution d'un air plus pur, moins chargé de poussières.

Or le sanatorium est-il indiqué pour ces tuberculeux? Pour les améliorér et pour les guérir, oui; mais non pour leur permettre de reprendre leur ancienne existence et surtout de s'exposer à des nouvelles contagions.

Car dans cette question de l'assistance au tuberculeux un premier point est résolu par le sanatorium, où l'on n'envisage que le traitement; mais, il faut autre chose, il faut un double complément au sanatorium, l'un est pour nous la colonie agricole et l'autre est la possibilité de subvenir à l'entretien du malade.

Dans la question de l'assistance au tuberculeux indigent le côté traitement est réalisé par le sanatorium, mais, il est nécessaire de leur adjoindre un complément permettant aux convalescents de parfaire leur guérison. Nous pensons que la forme la meilleure à donner à ce complément est la colonie agricole. A celle-ci nous voudrions, de plus, voir adjoindre l'appoint des sociétés de secours mutuels et celui d'assurances spéciales contractées par l'individu sain en cas de tuberculose échéante. On contracte des assurances contre l'incendie, contre les accidents, contre les épidémies des animaux, voir même contre la foudre; pourquoi n'en contracterait-on pas contre la tuberculose spécialement qui tue dans une ville comme Paris plus d'individus que le feu ou la foudre? Cette incidente comporterait des développements et des études de chiffres que nous ne voulons pas aborder ici où nous nous sommes donné comme programme d'énoncer les résultats d'une tentative existante.

Si, donc, on s'en tenait au sanatorium seul dans l'assistance aux indigents tuberculeux, on risquerait, incontestablement, des dépenses énormes, non pas en pure perte, mais pour un résultat certainement incomplet, et, si le sanatorium est un échelon important, il n'est que partie intégrante d'un tout homogène.

En prévoyant l'hospitalisation seule, si parfaite soit-elle dans le traitement des tuberculeux indigents et dans l'arrêt de la marche envahissante de la tuberculose, on commettrait une lourde erreur; celle-ci aurait pour conséquence les dépenses considérables dont nous parlions, et si la fortune implique des devoirs charitables, elle implique aussi les droits légitimes d'épargne. Il ne faut pas se faire d'illusions sur la longueur du traitement à imposer à un tuberculeux pour le guérir; on lit dans les ouvrages allemands traitant de l'hospitalisation pour les tuberculeux indigents, qu'un séjour de six mois au sanatorium est habituellement suffisant; il est difficile de souscrire à une pareille affirmation.* On peut en effet assurer, avec observation à

* Tout en rendant à la bienfaisance allemand l'éclatante justice qu'elle mérite pour la voie qu'elle nous a tracée depuis cinq ans, qu'elle a suivie à pas de géant et dans laquelle nous commençons à nous engager aujourd'hui. Il n'entre pas dans le cadre restreint de cette courte monographie de publier le détail de ce qui se fait en Allemagne; quoiqu'il en soit nous pouvons dire que l'empire allemand peut hospitaliser annuellement 25,000 tuberculeux adultes dans des asiles spéciaux; si en France nous en hospitalisons 2,000, c'est certainement un maximum que nous ne dépassons pas. Quand on songe que ces 25,000 hospitalisés allemands sont soignés, sont instruits de la nécessité qu'il y a pour un

l'appui, que, quels que soient les bénéfices immédiats et manifestes que puissent ressentir des tuberculeux au premier degré, hospitalisés dans les conditions requises, il en est 50 % dont la guérison n'est pas effectuée au bout de plus d'une année.

Or, de deux choses l'une, ou l'on fera du sanatorium une léproserie, considérant surtout le côté prophylactique de la question, et l'on y gardera les tuberculeux pendant une ou plusieurs années, ou bien on se conformera aux usages suivis dans les hôpitaux pour les maladies aiguës et quand il faudra de la place d'une façon formelle, on en fera en renvoyant les malades les plus améliorés, mais pourtant pas encore guéris. Ces idées là ont d'ailleurs été exposées dans une conférence faite l'année dernière, et publiée dans le premier numéro de l'œuvre anti-tuberculeuse. Une mesure s'impose donc pour assurer une issue aux convalescents sortant du sanatorium.

Il demeure bien évident que ces débiles (sinon ces malades), qu'on aura enlevés à la vie active, auxquels on aura imposé pendant plusieurs mois un régime de repos absolu, en les plaçant dans des conditions d'hygiène et de bien-être inconnues d'eux jusqu'alors, se trouveront, à leur sortie du sanatorium, sans aucun moyen d'existence, ayant perdu leur place et même leur habileté professionnelle, entretenue avant leur maladie par une pratique constante. Ils traineront la misère, ils mourront de faim à moins que, repris de leur maladie, ils ne viennent finir leur existence sur un lit d'hôpital. Autant voudrait presque, question de contagion à part, laisser ces malheureux finir de leur tuberculose. Admettons un instant que ce noir tableau n'existe pas, et que l'ouvrier sortant du sanatorium retrouve immédiatement son embauchage, admettons même qu'il soit complètement guéri de sa maladie, il n'en demeurera pas moins médicalement un intoxiqué de tuberculine, c'est à dire un individu retuberculisable au premier chef. Or cet individu retrouvera l'encombrement de l'atelier, l'encombrement du foyer ; retrouvera, dans la majorité des cas, l'entraînement à l'alcool, et l'on peut être sûr qu'au bout de quelques mois il reviendra au sanatorium avec des lésions nouvelles.

Ces lignes ne sont pas une critique du sanatorium ; celui-ci est indispensable, mais il exige un complément non moins indispensable, qui est la transplantation du malade aux champs. S'il est impossible à un tuberculeux de reprendre du travail à la ville, après un traitement de cinq ou six mois, il ne s'ensuit pas qu'il ne puisse être employé à la campagne, à des travaux agricoles réglés. C'est la Colonie agricole, de laquelle nous allons parler, qui en autorise l'affirmation.

Elle a permis de constater que là est une solution du problème, non pas en y faisant mais en y laissant travailler les malades selon leurs forces et selon leurs aptitudes. Les gros travaux de défoncement du sol étant faits préalablement par des bras mercenaires, les tuberculeux, soit guéris soit transformés

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malade de leur espèce à expectorer dans des crachoirs que l'on désinfecte chaque jour, quand ils se sont entendu répéter à satiété que, s'ils observent ce principe, ils cesseront d'être un danger pour leur entourage et même pour eux, on comprend quel rôle énorme le sanatorium joue dans l'arrêt de la contagion tuberculeuse et combien nous eussions été coupables de ne pas imiter les Allemands et de ne pas marcher à leur niveau.

en tuberculeux à tuberculose fermée, c'est à dire n'amenant plus d'expectorations et, partant, n'étant plus contagieuse, sont et seront instruits des différents principes de l'horticulture, du greffage, etc. ; ces ouvriers ne pourront jamais faire des manœuvres agricoles, mais deviendront des horticulteurs, des greffeurs, des pépiniéristes, métiers d'art en général bien payés.

Il est permis d'aller plus loin. Une exploitation de ce genre bien située, bien dirigée, peut rendre des bénéfices, et nous abordons ici un point très intéressant de la question : la possibilité pour les hospitalisés mariés de subvenir partiellement aux besoins de leur famille, tout en se soignant eux-mêmes dans la Colonie. C'est, en effet, à la famille de l'hospitalisé marié que doivent aller les bénéfices d'une pareille exploitation agricole, bénéfices calculés proportionnellement aux heures de travail fournies par l'intéressé.

Si, à une fondation de ce genre, on ajoute l'appoint de la mutualité, celui de l'assurance, soit à titre général, soit, mieux, au titre spécial d'une " Police contractée en cas de tuberculose," on a vraiment l'impression d'une œuvre d'ensemble, d'une chaîne dont les anneaux se lient bien et on n'a plus à discuter que les détails d'organisation pratique et les moyens d'ordre financier.

Nous ne saurions émettre cette prétention d'avoir mis au point la question de la Colonie agricole, mais, l'expérience que nous en avons faite, depuis bientôt deux ans, nous a donné des résultats assez satisfaisants, dans sa première partie, pour nous démontrer qu'elle est possible.

Avant de faire part de notre projet aux généreuses influences qui devaient se manifester par la suite, nous avions cherché dans le midi de la France, au nord des Alpes-maritimes, en un site appelé le Castel-Aras, à fonder un établissement pour recevoir nos malades. L'étendue des terrains, soixante hectares environ, leur éloignement de tout centre habité, leur disposition en côteau, convenaient admirablement au projet en question ; mais l'eau y était insuffisante et l'irrigation des terres difficile. D'autres emplacements furent examinés et écartés pour différents motifs. L'idée, cependant, faisait du chemin : il en est des idées comme des découvertes : elles sont, souvent, le résultat de contingences et d'une ambiance indéterminées ; pour quelques-unes au moins il serait parfois difficile de dire quel en est l'auteur principal. Le Docteur Dufournier, de Paris, conseilla à ce moment de placer à la campagne, chez le paysan, les malades de la ville porteurs de tuberculose fermée. Le Docteur Bourcart, de Cannes, au congrès de Londres et dans des conversations qu'il avait avec nous, préconisait un système voisin du nôtre.

Enfin, séduit par l'économie générale du projet, entraînées par leur charité toujours en éveil, de grandes protections venaient nous seconder et nous permettre de commencer une tentative que nous appellerons expérimentale.

Nous voulons rendre ici un modeste hommage aux généreux protecteurs de l'œuvre en citant quelques noms :—

Son Altesse I. et R. Madame l'Archiduchesse Isabelle d'Autriche,
Son A. R. Madame la Princesse C. de Bourbon, Comtesse Zamoyska,
Son A. S. la Princesse Emma de Croij-Dulmen,
Le Prince et la Princesse Czartoryski,
Madame la Duchesse de la Rochefoucauld-Doudeauville,

Monsieur le Comte et Madame la Comtesse Werlé,
Monsieur le Comte et Madame la Comtesse Vitali,
Lady Bloomfield,
Lord et Lady Rendel,
Lady Sommers,
Miss Talbot,
Monsieur le Comte et Madame la Comtesse Brancilli,
Le Général et Madame la Baronne de Charette,
Monsieur et Madame Taillandier,
Mademoiselle Marquant,
Mademoiselle Herblin,
Monsieur et Madame André Capron,
Monsieur le Capitaine de la Suderie de Calvairac,
Madame Marco del Pont,
Madame Renout,
Madame Scheurer,
Le Docteur Schutzenberger—

Voulurent bien patronner une œuvre à laquelle s'intéressaient :—

Monsieur le Docteur Roux, sous-directeur de l'Institut Pasteur, membre de l'Institut,
Monsieur le Professeur Landouzy,
Monsieur le Professeur agrégé Létulle,
Monsieur le Professeur agrégé Bezançon,
Monsieur le Docteur Martin, de l'hôpital Pasteur,
Monsieur le Docteur Cantacuzène, de l'Institut Pasteur, Professeur à la Faculté de Bucharest,
Monsieur le Docteur Jean Binot, Préparateur à l'Institut Pasteur.

Ces encouragements précieux, et un grand nombre d'autres qui me pardonneront de ne pas les citer au cours de ces lignes, me permirent de tenter un effort définitif après m'avoir bien fait expliquer le but auquel je tendais. Une circulaire précisant l'esprit de l'œuvre fut adressée en un grand nombre d'exemplaires ; nous y exposions l'idée d'un pavillon central pour les célibataires, et de maisons ou pavillons isolés pouvant recevoir les familles des gens mariés, créant ainsi une sorte de phalanstère où seraient venus en convalescence les tuberculeux atteints de tuberculose fermée, désirant apprendre un métier agricole et l'exercer par la suite. L'œuvre devait être ouverte à toutes les nationalités et à toutes les religions.

Sur le conseil de notre maître Monsieur le Docteur Roux, avant de pousser à son extrême développement notre projet, nous décidâmes d'en faire l'application sur un petit nombre de cas et de louer un emplacement propice à cet essai.

Un appel préparatoire fut fait, sous la forme de circulaire ainsi que nous l'énoncions plus haut, et sous celle d'une conférence privée chez Madame la Princesse Czartoryska à Cannes. A la suite de cet appel la somme de

3,500 francs nous fut remise; c'est avec ce faible appoint que la tentative d'expérimentation fut fondée.

Elle consiste en une maison située à cinq kilomètres d'altitude et cinq kilomètres de la mer, au milieu d'un terrain de six hectares. Aucune disposition ne la caractérise au point de vue spécial sinon la pureté de l'air ambiant, sa situation abritée des vents dominants et son éloignement de tout centre habité. Une route carrossable monte en sinuosités, le long de la colline, et passe au pied de la propriété; on y accède par un escalier en gradins, rappelant les anciens échelons à mulets, et conduisant à une terrasse à pic haute de sept mètres environ, sur laquelle est située la maison d'habitation.

Cette maison, orientée sud-nord, comprend: un rez-de-chaussée, ou sont placées les réserves, cave à vin, cave à charbon, cuisine. Un perron extérieur conduit au premier étage, un escalier intérieur monte de la cuisine au même premier étage. A ce niveau sont: un salon parloir et la chambre du Directeur, la salle à manger; le tout situé sur la façade sud et desservi par un couloir de dégagement au nord; sur la façade est se trouvent les w.c. et les chambres des domestiques. Un escalier, ménagé sur la façade ouest, monte au deuxième étage, disposé comme le précédent et réservé aux chambres des malades. Celles-ci situées au midi reçoivent chacune deux pensionnaires; la chambre à l'ouest sert de salle de douches.

L'eau est fournie par un canal coulant à flanc de côteau au dessus de la maison, permettant d'avoir à volonté l'eau de boisson qui est filtrée et bouillie et l'eau pour la lessive et l'irrigation. Les eaux usées et les matières sont reçues dans une fosse étanche située à 50 mètres de distance, à un niveau inférieur d'une quinzaine de mètres à celui de l'habitation elle-même. Cette fosse est désinfectée tous les huit jours. Une buanderie extérieure située sur la partie est de la terrasse permet le lavage à domicile.

Dans cette Colonie agricole, que nous appellerons "de fortune," pour employer un terme qui fait son chemin, nous avons hospitalisé depuis dix-huit mois trente-deux individus auxquels nous avons imposé tout d'abord la trilogie "repos, air et alimentation," pendant une durée variable représentant la période d'acclimatation.

Le malade arrive à la Colonie avec un trousseau composé de vêtements de laine, des galoches, un chapeau de paille. On lui fournit un thermomètre, deux crachoirs de poche en métal, et un crachoir de nuit. On le met alors à la vie du sanatorium. Quand il est suffisamment acclimaté, on le laisse travailler en le surveillant étroitement. Le règlement ci-dessous lui est strictement appliqué.

Règlement Intérieur des Colonies Agricoles.

Une discipline rigoureuse mais familiale est de règle dans l'établissement. Tout pensionnaire qui refuserait l'obéissance serait exclu par le Médecin en Chef, dont les décisions sont sans appel.

I.

Le réveil aura lieu à sept heures et demie.

II.

Le repas du matin aura lieu à huit heures.

III.

A huit heures et demie, rentrée dans les chambres pour les soins intérieurs.

1. Les pensionnaires feront leur lit, prendront soin de leurs objets personnels, balaieront à tour de rôle le sol des chambres, etc. Ce nettoyage sera fait au moyen de sciure de bois imbibée d'acide sulfurique. Sous aucun prétexte on ne devra voir dans les chambres d'objet de toilette apparent.

2. Pour les services communs un roulement sera établi entre les pensionnaires qui seront de jour à tour de rôle, en nombre variable suivant l'importance des services.

3. Toute latitude est laissée au Directeur de la Maison pour l'interprétation du paragraphe précédent, dans le double intérêt général et particulier.

IV.

Suivant le temps et les indications du Médecin en Chef, les pensionnaires occuperont soit à la cure d'air (dehors ou dans les chambres), soit aux leçons théoriques ou pratiques d'agriculture, le temps qui s'écoulera entre les occupations indiquées au chapitre précédent et l'heure du deuxième repas.

V.

Le deuxième repas aura lieu à onze heures, il sera pris en commun; le service sera fait à tour de rôle par un ou plusieurs pensionnaires, dans les conditions indiquées au paragraphe 2 du chapitre III.

VI.

Le repas aura une durée de trois quarts d'heure; après le repas les pensionnaires reprendront les occupations indiquées au chapitre IV.

VII.

1. Un quart d'heure avant le coucher du soleil, les malades entreront dans les chambres.

2. Les fenêtres qui seront demeurées ouvertes tout le jour, quel que soit le temps, seront fermées pendant trois quarts d'heure, elles seront ouvertes ensuite et resteront ouvertes toute la nuit.

3. Du coucher du soleil au troisième repas, les malades feront la cure de chaise longue ou de lit, selon indication.

4. Le troisième repas aura lieu à six heures dans les mêmes conditions que le deuxième.

5. Après une heure de conversation, le coucher sera obligatoire.

6. L'extinction des feux aura lieu à dix heures.

7. A partir de l'heure précitée, le silence sera de rigueur.

8. Tous les matins et tous les soirs on prendra la température axillaire de chaque pensionnaire.

VIII.

1. Les malades seront pourvus de deux séries de crachoirs. Deux crachoirs de poche et un crachoir de porcelaine contenant de l'eau phéniquée forte à 3 pour 100. En outre de ceux-ci, des crachoirs à pied seront disséminés dans l'établissement.

2. Les crachoirs de poche seront désinfectés quotidiennement avec de l'eau phéniquée forte. Il en sera de même pour les crachoirs à pied. Les crachoirs en porcelaine seront soumis à l'ébullition.

3. Tout pensionnaire qui serait surpris à ne pas cracher dans les crachoirs recevrait un premier avertissement.

4. Trois avertissements entraîneraient l'expulsion.

5. La désinfection devra s'étendre en général à tous les objets servant à l'alimentation.

IX.

1. Il est absolument interdit de sortir sans autorisation.

2. Les chants, les cris, les jeux bruyants sont rigoureusement défendus.

3. Les malades qui détérioreraient ou briseraient des objets appartenant à la Maison seront tenus de les remplacer à leurs frais.

X.

Il est absolument défendu de se livrer à des jeux d'argent, d'introduire des alcools et de fumer dans la Colonie.

Quand après un séjour de durée variable, le malade a la permission de s'occuper, on lui tolère une heure d'effort, ou, au moins, d'exercice ; puis on prend sa température. Si celle-ci est quelque peu augmentée, le repos est de nouveau imposé. En un mot on procède par tâtonnements.

Nous avons laissé entendre que l'installation est petite. Elle ne comporte que dix pensionnaires en même temps. La surface cultivable est modeste et les travaux auxquels peuvent se livrer les hospitalisés ne sont que des travaux de jardinage. Les résultats des cultures obtenues ne peuvent servir qu'à la table même des jeunes gens. Nous ne saurions donc aller plus loin et faire une incursion sur le côté financier et sur le rendement possible. Mais nous pouvons énoncer ce fait, c'est que, les grands fleuristes de la région nous ont promis de nous prendre pour la parfumerie toutes les productions florales que nous pourrions réaliser.

Or la fleur d'oranger amer se vend jusqu'à un franc le kilogram, la fleur de cassier huit et dix francs, la rose de parfumerie de quatre à cinq francs. Si nous ne parlons que des fleurs destinées à la parfumerie, c'est que nous voulons nous mettre à l'abri des reproches faits aux fleurs de bouquets et d'appartements, qu'avec une certaine exagération, croyons-nous, on a accusé de contenir dans leurs brillants pétales, les bacilles de la tuberculose. Ces

espèces florales poussent admirablement bien dans les régions où nous avons installé notre colonie. Elles prospèrent dans un terrain de 28 hectares dont nous poursuivons l'acquisition, avec l'espoir de pouvoir, après deux ans de lutte, nous installer enfin sans luxe mais d'une façon complète, ainsi que le projet ci-joint, qui a pour auteur M. Florentin Martin, architecte de l'hôpital Pasteur, en fait foi.

Nous ne saurions hésiter à pousser jusqu'à existence définitive l'installation dont il s'agit, dont les résultats éclatent dans les deux observations que nous joignons à cet exposé et que nous ne pouvons passer sous silence :

Le jeune G——, âgé de 18 ans, envoyé à la Colonie par le Professeur Landouzy, est admis le 1er janvier 1900 ; arrive avec une température de 40° et des signes de tuberculose aiguë ; il est mis au repos absolu, à 3 litres de lait par jour et 400 grammes de viande crue ; les signes généraux et la température persistent. Au moment où le traitement par l'eau froide allait être établi, une légère tendance au mieux semble s'annoncer ; elle s'accuse de plus en plus, les signes d'auscultation s'améliorent et la fièvre diminue. Au bout d'un mois de séjour la température était revenue à la normale ; les poumons étaient en bon état, sauf quelques signes d'auscultation au sommet du poumon gauche, et malgré des phénomènes aussi graves que ceux qui viennent d'être signalés le malade avait engraissé de près de trois kilos. Le jeune G—— est resté à la Colonie depuis ; il y a passé tout l'été, soumis à des heures de repos régulières mais ayant, entre temps, la permission de s'occuper à des travaux de jardinage. Il a traversé les chaleurs de l'été sans le plus léger dommage. Nous avons tenu à citer ce cas comme étant des plus démonstratifs.

Autre fait :

Le jeune F——, 19 ans, également envoyé à la Colonie par le Professeur Landouzy et entré à la même date. Tuberculose très nette du commencement du second degré, dont les signes siègent au sommet du poumon droit ; les symptômes s'améliorent rapidement. Au bout de six mois les signes d'auscultation ont disparu ; le malade, manquant absolument de moyens d'existence, est gardé à la Colonie pendant l'été. L'augmentation du poids du malade n'ayant pas dépassé 4 kilograms, l'autorisation de s'occuper de jardinage ne lui est accordée qu'avec beaucoup d'hésitation ; on constate, à partir de ce moment, que le malade prend meilleure mine, qu'il mange plus volontiers et davantage, que sa température n'augmente pas et qu'au bout du mois il avait augmenté de plus de 2 kilograms.

Ces deux observations fort intéressantes, et que nous avons rapportées avec la plus rigoureuse exactitude, peuvent servir à combattre utilement le scepticisme avec lequel certains médecins, même parmi les plus autorisés, ont accueilli à son début l'idée préconisée. Il demeure d'ailleurs bien établi que le travail auquel se livrent les malades dans des cas semblables doit être rigoureusement surveillé ; que leur dépense physique doit être contre-balancée par une nourriture d'épargne, qu'il ne faut marcher que le thermomètre à la main et réimposer le repos si la plus légère tendance à l'élévation de la température se manifeste. Nous y reviendrons.

Ces deux faits nous amènent à parler de la nourriture à la Colonie. Elle est ainsi réglée :

le matin	lait et œuf.
à dix heures. . .	viande crue ou lait.
à midi	deux plats de viande, légumes, fromages.
à quatre heures . .	lait ou viande crue.
à sept heures . .	soupe, viande, légumes, fromages.
au coucher . . .	lait.

Le tout est à discrétion et l'un de nos malades sorti nous disait que ce qui le gênait le plus hors la Colonie était de ne pouvoir s'alimenter dans des conditions pareilles.

C'est évidemment un des points délicats en terme d'hospitalisation spéciale du tuberculeux. Celle-ci doit porter, nous dirons avant tout, sur l'alimentation et de ce fait elle est chère.

Nous atteignons 5 fr. 60. On nous l'a beaucoup reproché. Nous estimons ne pas mériter ce reproche ; dans notre prix nous énonçons les frais généraux, et même le prix de la location de l'immeuble, soit donc l'amortissement du capital. Si l'on songe que les frais généraux seraient les mêmes pour un plus grand nombre de malades, que les marchés pourraient être passés en gros au lieu du demi-gros ; que les malades, faisant leur service eux-mêmes, l'augmentation de leur nombre n'entraînerait pas une augmentation proportionnelle du personnel, on voit que le prix de revient pourrait être très notablement abaissé par le développement de l'œuvre.

Un autre point important à signaler est le changement d'aspect des malades quand ils travaillent depuis quelque temps. De bouffis et de pâles qu'ils étaient, ils deviennent plus rapidement colorés, leur embonpoint paraît de meilleur aloi et d'apparence moins flasque. Ils vascularisent leur tissu adipeux, ils s'assimilent véritablement leur graisse et, nous aurons donné la note vraie, quand nous aurons cité le double cas de deux d'entre eux, entrés à la Colonie en novembre 1900 avec des lésions de tuberculose pulmonaire (deuxième degré, début) présentés en mai au Conseil de Révision avec un bulletin d'origine, et, déclarés tous deux bons pour le service. Ces deux jeunes gens n'avaient plus aucun signe d'auscultation, et leur physique était si satisfaisant qu'ils en avaient été félicités par le médecin chargé des opérations du conseil. Nous regrettons cette décision, persuadés que nous sommes de la non-guérison effective des deux sujets en question, mais ils étaient cependant en état de guérison apparente et le fait méritait d'être signalé.

Nous devons, avant d'aller plus loin, citer un grief dont on a argué contre notre œuvre.

On nous a reproché de faire un sanatorium modifié. Nous réfutons énergiquement cette affirmation. On s'est basé sur les deux observations signalées plus haut pour nous dire que nous ne prenions pas des convalescents mais des gens en pleine activité tuberculeuse. A ceci nous répondrons : que lorsque nous avons fondé notre Colonie il n'existait pas de sanatorium pour indigents à proprement parler. Hauteville était en construction, Angicourt de

même, et que, par conséquent, nous ne pouvions avoir recours à ce moment à aucune autre fondation similaire. De plus l'œuvre était une expérimentation. Nous pensions que démontrer plus que nous ne nous le proposions ne pouvait nous être reproché et enfin pour aller jusqu'au bout, voudrait-on que si une récidive de tuberculose venait à se produire chez un de nos convalescents nous le renvoyassions au sanatorium au lieu de le soigner nous-mêmes ?

Poser la question est la résoudre et nous ne croyons pas qu'il faille insister. En résumé c'est en vivant au grand air jour et nuit ; c'est en étant instruits des soins personnels qu'ils doivent prendre et des précautions qu'ils doivent observer pour ne pas être un danger à l'égard d'autrui, que nos hospitalisés reviennent à la santé. Nous estimons que, quelque peine qu'elle nous donne, quelque sacrifice personnel qu'elle nous coûte, cette œuvre doit non seulement vivre, mais s'agrandir et même se multiplier. Celle dont il vient d'être question a soulevé, au moment de sa fondation, un intérêt généreux dont nous ne pouvons, en termes suffisants, reconnaître assez la grandeur ; elle a soulevé aussi des craintes injustifiées auxquelles il est nécessaire de répondre. On a redouté l'arrivée dans un pays de luxe, comme la Riviera française, de malades pouvant être un danger pour le voisinage. A ceci il faut dire que le contraire est vrai, qu'enlever le boulanger tuberculeux à son pétrin, le tapissier à ses tentures, le tailleur et le couturière à leurs habits ou leurs corsages, les lingères à leur linon, c'est empêcher la contagion possible du fournisseur au consommateur, et démontrer qu'en soignant les uns on protège les autres. Quant à l'incrédulité qui s'est également manifestée sur la viabilité d'une œuvre comme celle-ci, la seule réponse qui devait lui être faite, c'est de présenter au public les résultats obtenus. C'est fait.

Il faut souhaiter, en terminant, que tout sanatorium qui se créera ait selon son importance, une ou plusieurs fondations semblables comme satellites où l'on prendra les convalescents qui le désireront et où on leur mettra un métier dans les mains. Après un apprentissage suffisant des œuvres de placement dirigeront ces ouvriers nouveaux vers les centres et les grandes exploitations agricoles pour le plus grand bien de la santé personnelle de ceux qui seront l'objet d'une semblable mesure. Dans leur nouvelle existence, ils trouveront à la fois la vie et le bonheur, et les sanatoriums auront accompli, dans son entier, *le grand œuvre* qu'ils se sont donné comme mission de remplir. Nous formulons ce vœu avec d'autant plus de conviction que nous avons, pour nous y affermir, la lettre suivante de Monsieur le Docteur Roux, de l'Institut Pasteur, notre maître, c'est par sa publication que nous terminerons ce rapport, estimant que tout ce que nous pourrions écrire après elle ne saurait qu'en affaiblir la portée :—

PARIS, *le 26 juin* 1901.

MON CHER VAUDREMER—

Vous me demandez ce que je pense de l'installation près de Cannes d'une Colonie agricole pour tuberculeux.

Je pense que c'est une fondation très utile et que rien ne peut mieux assurer la question du tuberculeux au début ou de ceux qui sortent améliorés

d'un sanatorium que le séjour, à la campagne, sous un climat favorable. Rendus à la grande ville, au bureau ou à l'atelier, ils deviendraient presque sûrement des phtisiques incurables ; retenus à la campagne, employés à des travaux gradués et peu fatigants, ils verront leur santé s'affermir. Ils auront les avantages que les riches viennent chercher sous ce ciel merveilleux de Cannes et, en même temps ils apprendront un métier agricole qui leur donnera la possibilité de vivre en plein air.

Cette combinaison me paraît excellente et je voudrais vous voir ouvrir non pas une mais beaucoup de Colonies agricoles.

D'ailleurs l'expérience que vous poursuivez depuis deux ans de la Colonie agricole du Cannet est si satisfaisante qu'il faut la continuer et l'étendre.

Je serai très heureux de vous aider de tout mon pouvoir dans cette bonne action.

Recevez, mon cher Vaudremer, l'assurance de mes meilleurs sentiments.

DR. ROUX.

DIVISION V.

STATISTICAL AND OTHER PAPERS.

STATISTICAL.

MEMORANDUM ON MORTALITY FROM TUBERCULAR PHTHISIS IN ENGLAND AND WALES DURING THE LAST FORTY YEARS.

By JOHN TATHAM, M.D., F.R.C.P.,

Of the General Register Office, Somerset House.

Incidence of Mortality, 1896–99 (Table A).

The mortality from phthisis at all ages in the four years 1896–9 was equal to a rate of 1521 per million living among males, and to a rate of 1141 per million among females. Among male children under 5 years old the rate was 403 per million, and among female children 334. Male children aged 5–10 years die at the rate of 140 per million, and female children of the same age at the rate of 201 per million. At ages 10–15 the male rate was 195, and the female rate 410 per million. In both sexes the real liability to phthisis begins somewhere between the 15th and the 20th year. Among males the death-rate at the age-group 15–20 years stands at 908 per million, and attains its maximum at age 45–55, when it reaches 3173. Among females at the age-group 15–20 years the rate is 1165, and attains its maximum (2096) at age 35–45. In both sexes the rate rapidly declines after the attainment of its maximum. Practically, the incidence of phthisis is upon the ages from 15–75 years, very old people and young children being comparatively exempt. According to recent experience, females seem to be rather *less liable* than males to death by phthisis at ages under 5 years, *more liable* at the age 5–20 years, and again *less liable* at subsequent ages. Liability to fatal phthisis appears to commence somewhat earlier in females than in males.

TABLE A.

ENGLAND AND WALES.—TUBERCULAR PHTHISIS.—MORTALITY IN SEVERAL PERIODS, 1851–1899.—ANNUAL RATE PER MILLION LIVING.

MALES.

Period.	AGES.											
	All Ages.	Under 5 Years.	5—	10—	15—	20—	25—	35—	45—	55—	65—	75—
1851–60	2579	1329	525	763	2399	4052	4031	4004	3830	3331	2389	928
1861–70	2467	990	431	605	2190	3883	4094	4166	3861	3297	2024	659
1871–80	2209	783	340	481	1675	3092	3699	4120	3860	3195	1924	603
1881–85	1927	584	274	372	1381	2467	3246	3726	3567	2937	1800	645
1886–90	1781	521	234	318	1212	2222	2842	3436	3446	2904	1845	733
1891–95	1634	467	197	260	1075	2026	2548	3268	3205	2686	1572	563
1896–99	1521	403	140	195	908	1841	2341	3110	3173	2627	1530	549

FEMALES.

Period.	AGES.											
	All Ages.	Under 5 Years.	5—	10—	15—	20—	25—	35—	45—	55—	65—	75—
1851–60	2774	1281	620	1293	3516	4288	4575	4178	3121	2383	1635	716
1861–70	2483	947	477	1045	3112	3967	4378	3900	2850	2065	1239	447
1871–80	2028	750	375	846	2397	3140	3543	3401	2464	1777	1093	407
1881–85	1738	553	350	749	2006	2596	3070	2927	2197	1541	995	372
1886–90	1497	483	307	658	1626	2075	2552	2563	1936	1490	966	423
1891–95	1303	421	260	561	1428	1740	2155	2305	1742	1294	800	350
1896–99	1141	334	201	410	1165	1547	1862	2096	1597	1242	787	366

TABLE B.—PHTHISIS:—Mean Annual *Crude* Death Rates in Registration Counties during the periods 1881–90 and 1895–9.

Registration Counties.	1881–90.			1895–9.			Ratio of Mortality in 1895–9 to that in 1881–90 taken as 100.		
	Persons	Males.	Females	Persons	Males.	Females	Persons	Males.	Females
England and Wales	1724	1847	1609	1334	1526	1154	77	83	72
London	2078	2547	1659	1763	2252	1324	85	88	80
Surrey	1574	1822	1352	1122	1335	932	71	73	69
Kent	1511	1554	1470	1170	1304	1042	77	84	71
Sussex	1662	1855	1493	1302	1552	1092	78	84	73
Hampshire	1849	2088	1625	1457	1750	1186	79	84	73
Berkshire	1473	1596	1353	1102	1269	942	75	80	70
Middlesex	1376	1556	1216	1030	1240	845	75	80	69
Hertfordshire	1434	1546	1327	1144	1349	953	80	87	72
Buckinghamshire	1295	1252	1337	965	1067	867	75	85	65
Oxfordshire	1388	1459	1321	1032	1198	881	74	82	67
Northamptonshire	1413	1443	1384	1154	1307	1005	82	91	73
Huntingdonshire	1536	1468	1602	998	1116	885	65	76	55
Bedfordshire	1507	1388	1612	1072	1163	991	71	84	61
Cambridgeshire	1666	1674	1659	1273	1406	1146	76	84	69
Essex	1431	1479	1383	1068	1200	939	75	81	68
Suffolk	1707	1663	1748	1188	1232	1146	70	74	66
Norfolk	1495	1462	1527	1068	1093	1044	71	75	68
Wiltshire	1451	1429	1471	991	1055	928	68	74	63
Dorsetshire	1392	1352	1430	1071	1060	1081	77	78	76
Devonshire	1708	1757	1663	1350	1463	1250	79	83	75
Cornwall	1766	1877	1669	1224	1414	1059	69	75	63
Somersetshire	1352	1428	1284	1189	1279	1112	88	90	87
Gloucestershire	1480	1542	1426	1080	1235	946	73	80	66
Herefordshire	1249	1206	1291	988	1019	958	79	84	74
Shropshire	1369	1368	1371	1026	1087	966	75	79	70
Staffordshire	1346	1412	1279	1045	1178	914	78	83	71
Worcestershire	1196	1338	1067	980	1166	812	82	87	76
Warwickshire	1604	1889	1335	1343	1721	988	84	91	74
Leicestershire	1292	1372	1217	1065	1224	917	82	89	75
Rutlandshire	1272	1191	1352	742	756	728	58	63	54
Lincolnshire	1467	1326	1606	1066	1041	1090	73	79	68
Nottinghamshire	1605	1604	1607	1097	1163	1035	68	73	64
Derbyshire	1406	1365	1446	1065	1149	982	76	84	68
Cheshire	1606	1667	1549	1238	1336	1148	77	80	74
Lancashire	1954	2101	1816	1516	1769	1282	78	84	71
West Riding	1852	1985	1724	1330	1508	1161	72	76	67
East Riding	1653	1685	1622	1243	1355	1136	75	80	70
North Riding	1467	1379	1557	1125	1185	1065	77	86	68
Durham	1699	1592	1811	1366	1382	1350	80	87	75
Northumberland	2086	2121	2051	1664	1842	1486	80	87	72
Cumberland	1621	1591	1651	1221	1200	1242	75	75	75
Westmoreland	1404	1354	1451	852	887	819	61	66	56
Monmouthshire	1411	1286	1543	944	901	990	67	70	64
South Wales	2008	1936	2080	1435	1379	1491	71	71	72
North Wales	2077	2012	2140	1564	1613	1517	75	80	71

Changes in Mortality from 1851–99.

Table A indicates that, with a few trifling exceptions, every age-group in both sexes has experienced *a decrease* in the mortality ascribed to phthisis. In every case the mortality in 1895–9 was lower than it had been in 1851–60; but the rate of decrease has varied widely, and has been much greater among females than among males. The reduction indicated by the table may not be wholly real, and may be due in part to the vaguer statement of causes of death in the earlier period; as, for instance, by the habitual use of the terms "consumption" and "decline" to describe any lingering disease of the lungs attended by "wasting." The figures must therefore be taken for what they are worth.

Comparing 1896–9 with 1851–60 we find that phthisis mortality in males *at all ages* has been reduced from 2579 to 1521 per million, and in females from 2774 to 1141 per million. At ages under 5 years the mortality of males has been reduced from 1329 in the earlier period to 403 in the later, and that of females from 1281 to 334. At the age-group 5–10 years the rate has fallen from 525 to 140 among males, and from 620 to 201 among females. At the age-group 10–15 years the male rate, which in 1851–60 had been 763 per million, has been reduced to 195, and the female rate, which had been 1293, has been reduced to 410. From 15 years upwards the female rate has fallen more than the male. From 25 years to the end of life the male rate has fallen in varying proportions. The fall in the female rate at the successive age-groups after 25 years has not differed greatly from one-half.

Tracing backwards the incidence of maximum mortality from phthisis, we find that it has not always been at ages from 45 to 55 for males and from 35 to 45 for females, as it is at present. In the decade 1851–60 phthisis mortality was at its highest among males at ages from 20 to 25, and among females at ages from 25 to 35. Thus the age of maximum phthisis mortality has been postponed in both sexes. In other words, either the saving of life has been greater at the ages which were formerly most liable to phthisis than at the ages immediately following, or persons specially liable to phthisis have lived longer than they would have done under the earlier conditions. Two other tables are herewith submitted. Table B compares the phthisis mortality in 1881–90 with that in 1895–9 in each of the Registration Counties of England and Wales. It also shows the proportional decrease in the phthisis rate of each county in the later four-year period, as compared with the earlier decennium.

The following table (C) shows that the mortality from phthisis is also very seriously affected by occupation. Thus among people, presumably not widely different in respect of social position, such as tin-miners and coal-miners, a number of males living at ages 25–65, which gave 508 deaths from phthisis among tin-miners, gave only 69 deaths (or only one-seventh part) among coal-miners.

TABLE C.

Comparative mortality figures of men aged 25–65 years engaged in different occupations: (*a*) from all causes, (*b*) from phthisis, (*c*) from diseases of the respiratory system.

	Occupations.	All Causes.	Phthisis.	Respiratory Diseases.
	All Males	1000	192	224
Highest	Tin-miners	1400	508	377
	Inn and Hotel Servants	1725	476	363
	Unoccupied Males	2215	448	294
	Costermongers	1652	443	403
	Earthenware Manufacturers	1706	333	668
	Coal-miners (Derby, Notts.)	727	69	159
	Farmers	563	79	90
	Brick and Tile Makers	741	84	201

SOME OBSERVATIONS ON THE INFLUENCE OF CERTAIN SOCIAL CONDITIONS AND OF FOOD ON THE MORTALITY FROM PHTHISIS.

By Dr. JOSEPH VON KÖRÖSY,

Director of Municipal Statistics of Budapest; Hon. F.R.S.S., Corresponding Member of the Manchester Statistical Society.

The number of deaths caused by phthisis in Budapest is continually diminishing, as may be seen by the following figures:

Out of 100,000 living there died by phthisis:

1875	847	1884	738	1893	433
1876	855	1885	693	1894	382
1877	799	1886	704	1895	423
1878	828	1887	610	1896	392
1879	825	1888	628	1897	357
1880	832	1889	520	1898	349
1881	758	1890	569	1899	399
1882	701	1891	498	1900	386
1883	758	1892	446		

I have considered the influence of certain social conditions in relation to phthisis mortality, viz., influence of wealth, occupation and religious profession.*

I. Influence of Occupation.

During the period 1874–1890 I have observed the connection between occupation and causes of death of 57,910 males and 49,034 females, above fifteen years of age. According to these observations I may state that mortality from consumption was greatest among printers.

We find that amongst printers 60·0 per cent. died from consumption. Thus it may be stated that printers die more frequently from phthisis than from all other causes combined. Next follow butlers, 52 per cent.; shoemakers, dyers and millers, 49·4, 49·3, 49·2 per cent.; joiners, tinkers and locksmiths, 48·5 and 48·4 per cent.; masons, 46·7 per cent.; workmen, 43·3 per cent.; tailors, 41·8 per cent.; bakers, 39·8 per cent.; journeymen, 39·8 per cent.; drivers, 37 per cent.; servants, 36 per cent.; carpenters, 33·9 per cent.; officials, 33·6 per cent.; butchers, 33·3 per cent.; merchants, 28·3 per cent.; innkeepers, 27·2 per cent. The smallest proportions are: capitalists, 10·6 per cent.; physicians, 11·8 per cent.; and lawyers, 20·5 per cent.

Among females the proportions are needlewomen, 51·2 per cent.; female

* The results of these observations were first published in my book on the mortality of the City of Pest: Sterblichkeit der Stadt Pest in den Jahren 1872–73 (Berlin 1876), and subsequently for the City of Budapest in the corresponding publications for 1874–75 (Berlin, 1877), 1876–78 (Berlin, 1887), 1882–85 (Berlin, 1888), 1886–90 (Berlin, 1898).

servants, nearly 35·3 per cent.; female day-labourers, 33·3 per cent.; and washerwomen, 31·4 per cent; but among female gardeners only 26·9 per cent., and among capitalists only 4·2 per cent., of the total deaths were due to phthisis.

In connection with these observations, however, we cannot neglect the influence of differences in the age distribution of persons following different occupations. We know that mortality from consumption depends markedly upon age, as it most frequently occurs with and after the age of puberty, and reaches its culmination between the thirtieth and fortieth year of age. It is therefore advisable to observe the extent of this cause of death at the several ages for each of the occupations shown. This I have been able to do from the year 1882, but, to my regret, only for the following ages: 15–30, 30–50, and above 50 years. In future the class of 30–50 will be subdivided into two groups, 30–40 and 40–50; but for present purposes I can only give the data for the above-mentioned three age-groups. The following figures are extracted from my work on the mortality of the city of Budapest in the years 1886 to 1890; pages 110 and 151–164:—

NUMBER OF DEATHS FROM CONSUMPTION PER CENT. OF DEATHS FROM "ALL CAUSES" IN THE YEARS 1882–1890 IN THE FOLLOWING 22 MALE AND 6 FEMALE OCCUPATIONS, CLASSIFIED ACCORDING TO THREE AGE-GROUPS.*

Amongst 100 cases of death there are caused by consumption:

Occupation.	15 to 30 years.	30 to 50 years.	Above 50 years.	TOTAL.
MALES—				
Journeymen	42·9	42·0	32·0	39·1
Officials	71·7	37·6	16·2	31·5
Merchants	54·4	35·3	14·7	28·7
Shoemakers	63·8	56·1	28·6	48·9
Tinkers and Locksmiths	57·9	53·1	32·1	49·8
Tailors	62·9	53·6	23·9	40·8
Joiners	50·2	57·7	31·1	47·4
Capitalists	*	30·4	6·0	9·5
Servants	40·2	51·3	24·5	37·4
Masons	53·3	53·7	36·8	49·1
Drivers	49·7	42·6	23·6	38·8
Innkeepers	*	37·0	17·9	27·8
Butlers	56·2	50·8	(34·4)	50·3
Butchers	(43·7)	41·4	24·6	36·6
Workmen	(38·9)	45·3	45·6	44·2
Carpenters	*	50·9	22·4	36·6
Millers	*	59·9	39·5	51·5
Dyers	(71·9)	55·2	25·2	50·3
Printers (Compositors)	81·7	(55·9)	*	63·7
Bakers	(44·6)	48·5	25·0	40·1
Lawyers	*	(29·4)	(9·8)	19·8
Physicians	*	(15·1)	(1·2)	10·7

* Where less than 50 deaths occur in any age-group, I have omitted to calculate any percentage; where the number was from 50 to 100 the ratio has been calculated, but put into brackets in order to show the reader that the percentages are not based upon numbers large enough to give reliable results.

Occupation.	15 to 30 years.	30 to 50 years.	Above 50 years.	TOTAL.
FEMALES—				
Journeywomen	48·0	42·2	21·9	34·2
Servants	38·9	43·3	18·2	36·5
Capitalists	(69·3)	32·8	8·1	13·2
Needlewomen	65·6	42·5	18·2	49·7
Washerwomen	*	38·1	17·9	29·8
Gardeners	(48·1)	(29·5)	20·5	26·5

The following table shows on one hand the frequency of consumption, and on the other that of pneumonia, including pleuritis and bronchial catarrh, for the most important age period, viz., 30 to 50 years.

AMONGST 100 DEATHS AMONG MALES AT THE AGE OF 30–50 YEARS, OF THE FOLLOWING OCCUPATIONS DIED BY:

	Consumption.	Pneumonia.	Numerical Order.		DIFF.
	%	%	Consumption.	Pneumonia.	
Physicians	(15·1)	(7·5)	1	15	+14
Lawyers	(29·4)	(5·1)	2	8	+ 6
Capitalists	30·4	5·9	3	11	+ 8
Merchants	35·3	3·9	4	3	— 1
Innkeepers	37·0	3·3	5	1	— 4
Officials	37·5	5·8	6	10	+ 4
Butchers	41·4	9·0	7	17	+10
Journeymen	42·0	13·6	8	22	+14
Drivers	42·6	9·7	9	19	+10
Workmen	45·3	11·0	10	20	+10
Bakers	48·5	5·0	11	7	— 4
Butlers	50·8	4·0	12	4	— 8
Carpenters	50·9	11·5	13	21	+ 8
Servants	51·3	6·6	14	12	— 2
Tinkers and Locksmiths	53·1	7·7	15	16	+ 1
Tailors	53·6	5·1	16	9	— 7
Masons	53·7	7·2	17	14	— 3
Dyers	55·2	6·7	18	13	— 5
Printers (Compositors)	55·9	4·3	18	5	—14
Shoemakers	56·1	3·7	20	2	—18
Joiners	57·7	4·9	21	6	—15
Millers	59·9	9·4	22	18	— 4

We see at first sight that *not only printers, but also shoemakers, joiners, and especially millers are extremely liable to die of consumption.*

We find, further, that joiners and shoemakers occupy in the scale of consumption nearly the two highest places, viz., the 21st and 20th places; whilst in that of pneumonia they occupy very low places, viz., 6th and 2nd; that printers in the scale of consumption rank very high, 19th, whilst in that of

* Where less than 50 deaths occur in any age-group, I have omitted to calculate any percentage; where the number was from 50 to 100 the ratio has been calculated, but put into brackets in order to show the reader that the percentages are not based upon numbers large enough to give reliable results.

pneumonia they occupy a very low place, 5th; on the contrary, physicians are the least attacked by consumption, but very often—15th place—by pneumonia; journeymen and drivers are also more exposed to pneumonia. Perhaps the movement in open air, which often leads to catching cold, tends rather to pneumonia-pleuritis than to consumption, whilst occupation in closed localities tends more to consumption. It may be also observed that, though the professions of physicians and lawyers comprehend men of similar social standing, physicians, perhaps because they often change from heated rooms to the cold outer air, are much more exposed to pneumonia than lawyers, who lead a more sedentary life, and who perhaps, therefore, are less exposed to pneumonia, but more to consumption. Such observations led me to consider the influence of the character of certain work, and the conditions under which certain work is carried on. The results (compare quoted work, page 104) are as follow:

RESULTS ACCORDING TO CHARACTER AND CONDITIONS OF OCCUPATION.

	Total number of deaths.	Out of these			
		Phthisis	Equals per cent.	Pneumonia and the other diseases of respiratory organs	Equal per cent.
Mental work	4,487	1,523	33·9	2,106	46·9
Physical work	3,731	1,488	39·9	2,058	55·2
With poisonous substances	570	313	54·9	369	64·7
In heat	372	148	39·8	215	57·8
In dust	1,274	588	46·2	799	62·7
Sedentary work	7,916	3,473	43·9	4,402	55·6
Working in upright position	6,639	2,838	42·7	3,881	58·5
Working in closed localities	14,181	6,299	44·4	8,149	57·5
Working in open air	4,011	1,575	39·3	2,248	56·0

Thus, deaths caused by diseases of the respiratory organs are rarest among men engaged in mental work, and most frequent among persons working with poisonous substances and in dusty air.*

2. INFLUENCE OF WEALTH.

Since the year 1871 I have been able to classify the deaths (each case of death according to the following four categories: very rich, wealthy, poor and

* All conclusions on the connection between mortality and occupation are liable to criticism, inasmuch as greater mortality is not always the *effect* of occupation, but sometimes, on the contrary, the choice of occupation depends on the strength or the vital force of the individual, so that—in consequence of this selective influence on some occupations—the casualty is sometimes quite inverted. The problem whether the greater mortality of consumption is to be attributed to this selective influence, or to the insalubrity of the occupation, may—according to Dr. Bertillon—be solved in the following manner: If the mortality from phthisis is greater amongst younger people and smaller amongst older ones, it proves that occupation is not to be regarded as a cause of the sickness, but that the occupation is one which has been largely selected by persons of weak health.

indigent.*) If, however, we wish to draw conclusions from these figures, we have one great difficulty to surmount, viz., that although we know the number of the poor and rich among the total dead, or that of each cause of death, we do not know the number of the rich or poor people living. Thus we cannot establish the required ratio between the living and dead of each category. Nevertheless this difficulty does not seem quite insurmountable. Summing up the very rich with the wealthy, and the poor with the indigent, we have altogether 15,961 deaths of wealthy and 90,699 deaths of poor. Now, if wealth is without any influence upon the occurrence of any special disease, the ratio of the deaths from such diseases to the total deaths from "all causes" should be the same amongst poor and rich. But we see that out of 100,000 wealthy deceased, there died of consumption 15,943, whilst out of 100,000 poor there died of consumption 22,339.

Hence we may say that phthisis causes amongst poor people 40 per cent. more deaths.

3. Influence of Conditions Associated with Religious Professions.

It is a characteristic feature of the social composition of the population of Budapest that social standing and occupation is often connected with religious belief.

The great majority of the population belong to the Roman Catholic Church—1891: 64·7 per cent; next follow the Jews, 21 per cent.

The following figures may furnish some information about the connection between religious belief and occupation: compare Körösy: "Die Hauptstadt Budapest im Jahre 1891" (Berlin, 1898):

Out of 10,000 Males of the following Religious Professions are engaged:—

	Roman Catholics.	Lutherans.	Calvinists.	Jews.
In Industry	1,744	2,043	1,695	1,652
,, Transport	296	346	1,481	164
,, Commerce	204	846	212	1,311
,, Physical Work	2,780	3,276	2,813	993
,, Mental Work	344	487	2,510	311

This shows that Catholics have a predilection for the occupation of gardeners, wine-growers, masons, barbers, shipbuilders, day-labourers; but they are rarely postal officials, agents, booksellers, lawyers, or physicians. The Lutherans often become butchers, innkeepers, locksmiths, or mechanicians, but

* The method of our mortality statistics is fully explained in vol. VII. of the "Deutsche Vierteljahrsschrift für öffentliche Gesundheitspflege," Braunschweig, 1875, pages 238-249.

seldom drivers or working men. The Calvinists frequently become agriculturists, shoemakers, joiners, smiths, railway officials, drivers, post and telegraph officials, servants, or public officers, whilst rarely butchers, innkeepers, masons, jewellers, industrial artists, mechanicians, upholsterers, or pedlars. Jews belong chiefly to the following occupations: tailors, jewellers, tinkers, printers, industrial artists, merchants, agents, street commissioners, lawyers, or physicians, but are not to be found in the following occupations: gardeners, wine-growers, breeders of cattle, washers, pavers, bricklayers, shipbuilders, or chimney sweepers.

The Jews in general are remarkable for the care which they take of their health and that of their children.

Now, the frequency of consumption was in the average of the five years 1885–1890 out of 100,000 people living (compare Körösy: "Die Sterblichkeit der Hauptstadt Budapest," 1886–1890 (Berlin, 1898), page 49):—

Roman Catholics	722	
Lutherans . .	788	Protestants together 625
Calvinists . .	559	
Jews	375	

As previously mentioned, the different age-distribution of the groups of population in different religious classes largely affects the mortality figures of consumption. But it is obvious that the influence of this factor is not important enough to explain the great divergence of the above quoted statistics.* Especially as to the Jewish part of the population it is not to be doubted that they are far less liable to death from consumption than those of other religions.

4. Influence of Children's Food.

During the seven years 1882–1890, 37,313 deaths of children, aged 0–2 years, were observed with regard to whether they were brought up in the family or outside, and whether they were nourished at breast or artificially.

* This may be seen by the following figures:

Out of 100 living there were (1891):

Years of Age.	Roman Catholics.	Lutherans.	Calvinists.	Jews.
0–5	10·2	9·0	9·2	10·4
5–10	7·8	6·9	6·9	9·2
10–20	18·5	17·7	17·2	23·0
20–50	51·3	54·1	57·5	45·4
50–60	6·7	7·2	5·6	6·4
over 60	5·5	5·1	3·6	5·6

The results of these observations (compare the quoted work, pages 128, 129, and 180–189) are as follows:—

	Brought up in the family.		Foster-children.		Total.	
	Number of the deceased.	Out of these died by Consumption.	Number of the deceased.	Out of these died by Consumption.	Number of the deceased.	Out of these died by Consumption.
Nourished at breast	29,679	1,570	1,038	90	30,717	1,660
„ artificially	5,461	348	1,135	185	6,596	533
Total	35,140	1,918	2,173	275	37,313	2,193

We find that amongst 100 deceased children there died by consumption if brought up in the family, 5·4 per cent.; if foster-children, 8·9 per cent.; if nourished at breast, 5·4 per cent.; if nourished artificially, 9·5 per cent.

Combining the two conditions we find:—Nourished at breast: at home, 5·2 per cent.; foster-children, 8·7 per cent.; nourished artificially: at home, 6·4 per cent.; foster-children, 16·3 per cent.

Thus we see that amongst foster-children nourished artificially consumption appears *three times* more than amongst children brought up at home and nourished at breast.

5. Influence of the Paternal Age.

The following results are quoted from my paper read at the London Congress of Hygiene and Demography. They refer to 10,385 deaths of children, aged 0–10 years, classified according to the age of father and mother. I found that amongst 100 deceased children the number of deaths from consumption was at the maternal age of:—Under 20 years, 8·45; 20–30 years, 5·09; 30–35 years, 2·78; above 35 years, 4·26.

Thus consumption appeared most frequently amongst children born of very young mothers, whilst its frequency diminished among children born of middle-aged mothers and rose anew with children born of mothers above 35 years of age.

As to the father, we find also that children of the youngest and eldest fathers are most frequently tuberculous, viz., at the paternal age of:—Under 25 years, 5·71; 25–30 years, 4·74; 30–40 years, 3·61; 40–50 years, 6·01.

MORTALITÉ PAR AFFECTIONS TUBERCULEUSES EN BELGIQUE.

RENSEIGNEMENTS RECUEILLIS ET CLASSÉS PAR
M. LE DR. GODART-DANHIEUX
à la demande de M. le Sénateur MONTEFIORE LEVI.

Presented to the British Congress on Tuberculosis by G. Montefiore Levi, delegate of the Belgian Government.

MORTALITÉ PAR AFFECTIONS TUBERCULEUSES,
de 1888 à 1898 inclus, calculée par 10,000 habitants.

	Bruxelles.	Faubourgs.	Agglomération.
1888	40·3	37·2	38·4
1889	42·8	33·5	37·1
1890	47·0	36·6	40·6
1891	44·1	35·6	38·8
1892	39·2	33·1	35·4
1893	36·00	32·2	33·6
1894	35·4	30·7	32·0
1895	31·7	30·4	31·1
1896	30·6	30·6	30·6
1897	26·8	27·9	27·4
1898	25·2	24·2	24·5

MORTALITÉ TOTALE PAR AFFECTIONS TUBERCULEUSES EN ONZE ANS.

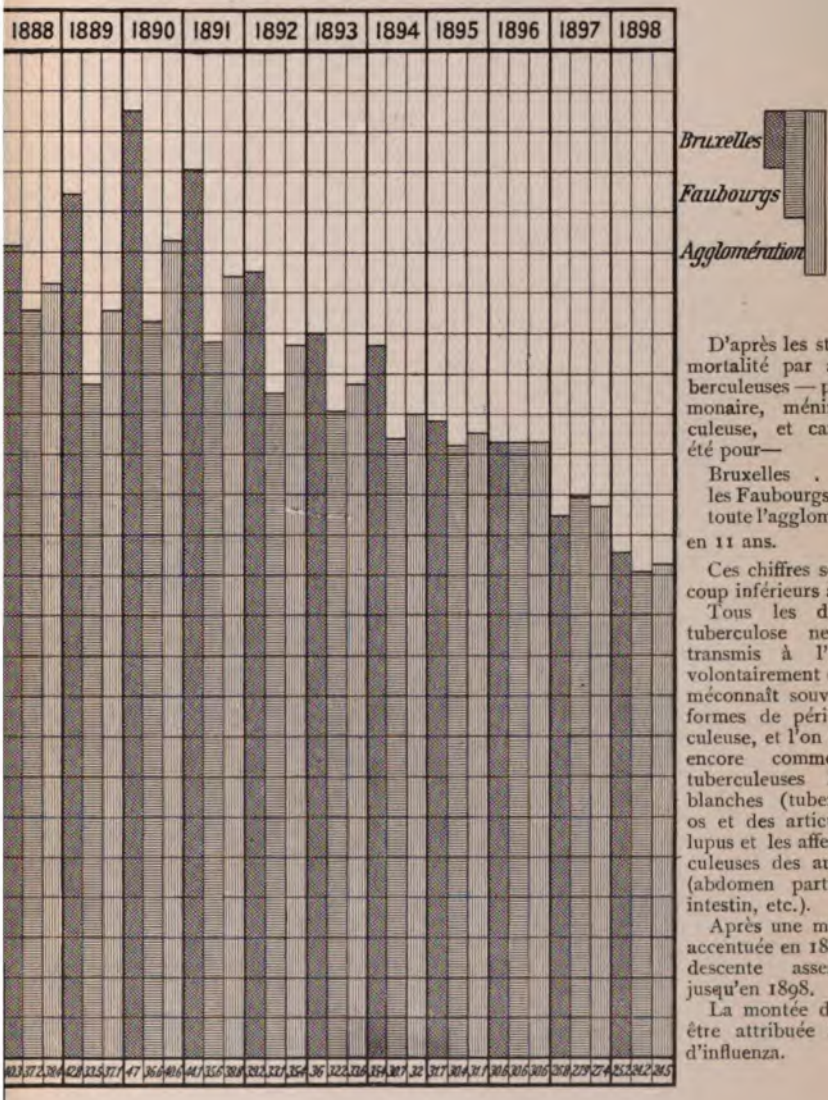
Bruxelles.	Faubourgs.	Agglomération.
7,382	10,803	18,185

MORTALITÉ PAR AFFECTIONS TUBERCULEUSES PAR 10,000 HABITANTS.

	Anvers.	Gand.	Liége.
1888	37·7	37·9	27·5
1889	37·1	30·7	22·0
1890	36·0	39·5	23·3
1891	36·9	38·0	20·0
1892	32·4	34·1	19·2
1893	28·8	18·9	20·8
1894	22·4	18·9	20·5
1895	23·1	18·0	21·7
1896	20·7	15·4	19·4
1897	18·7	...	16·2
1898	18·1	21·2	18·1

I.

Mortalité par affections tuberculeuses calculée par 10.000 habitants, de 1888 à 1898 inclus.



D'après les statistiques, la mortalité par affections tuberculeuses — phthisie pulmonaire, méningite tuberculeuse, et carreau—aurait été pour—

Bruxelles . . 7,382,
les Faubourgs . 10,803,
toute l'agglom. 18,185,

en 11 ans.

Ces chiffres sont de beaucoup inférieurs à la réalité.

Tous les diagnoses de tuberculose ne sont pas transmis à l'État Civil, volontairement ou non. On méconnaît souvent bien des formes de péritonite tuberculeuse, et l'on doit compter encore comme maladies tuberculeuses les tumeurs blanches (tuberculoses des os et des articulations), les lupus et les affections tuberculeuses des autres organes (abdomen particulièrement, intestin, etc.).

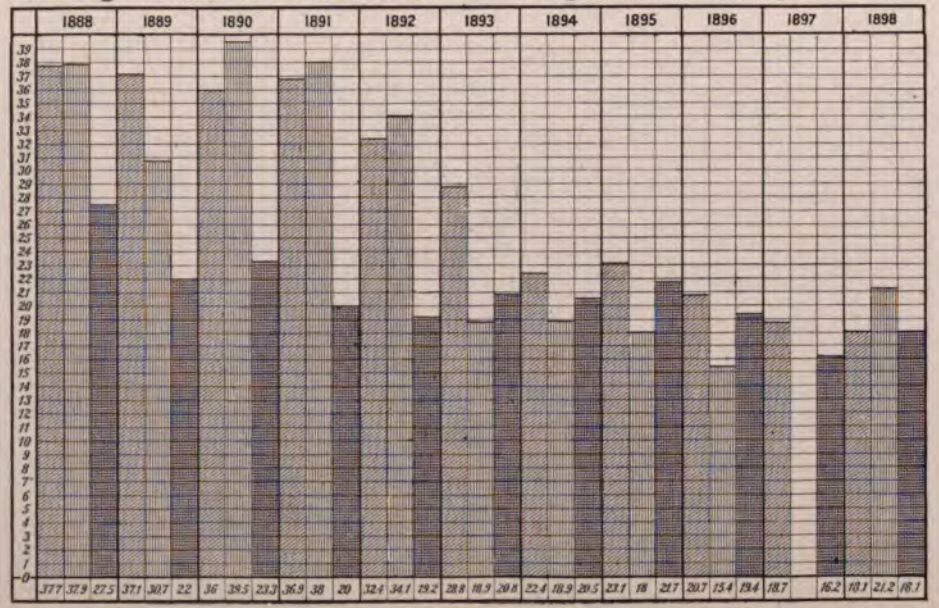
Après une montée surtout accentuée en 1890, il y a une descente assez régulière jusqu'en 1898.

La montée de 1890 peut être attribuée à l'épidémie d'influenza.

[*To face page* 506.

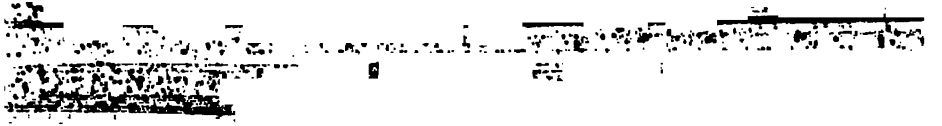
II.

Mortalité par affections tuberculeuses à Anvers, Gand et Liège, de 1888 à 1898 calculée par 10.000 habitants.



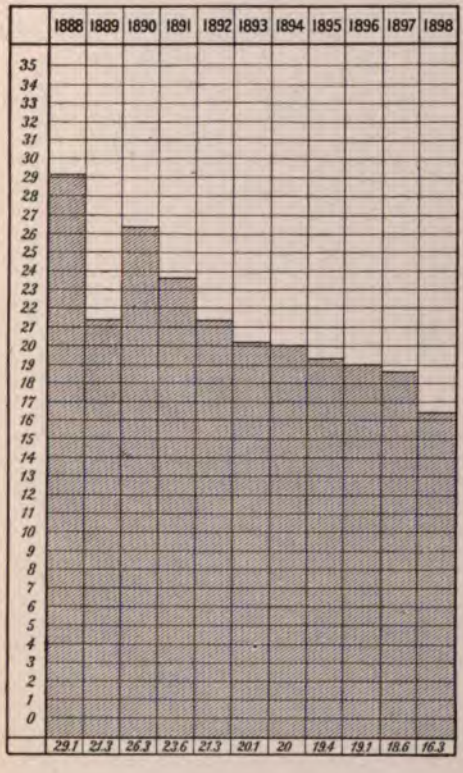
On peut constater une diminution notable de la tuberculose, particulièrement à Gand et à Anvers, à partir de 1893 et 1894; à noter aussi la mortalité beaucoup plus faible à Liège, et une légère recrudescence de la mortalité dans cette dernière ville en 1898. (Mêmes réserves pour ce tableau que pour les chiffres du tableau I.)

[*To face page* 506.



III.

Mortalité par affections tuberculeuses dans 20 villes et communes importantes du pays, calculée par 10,000 habitants, de 1888 à 1898 inclus.



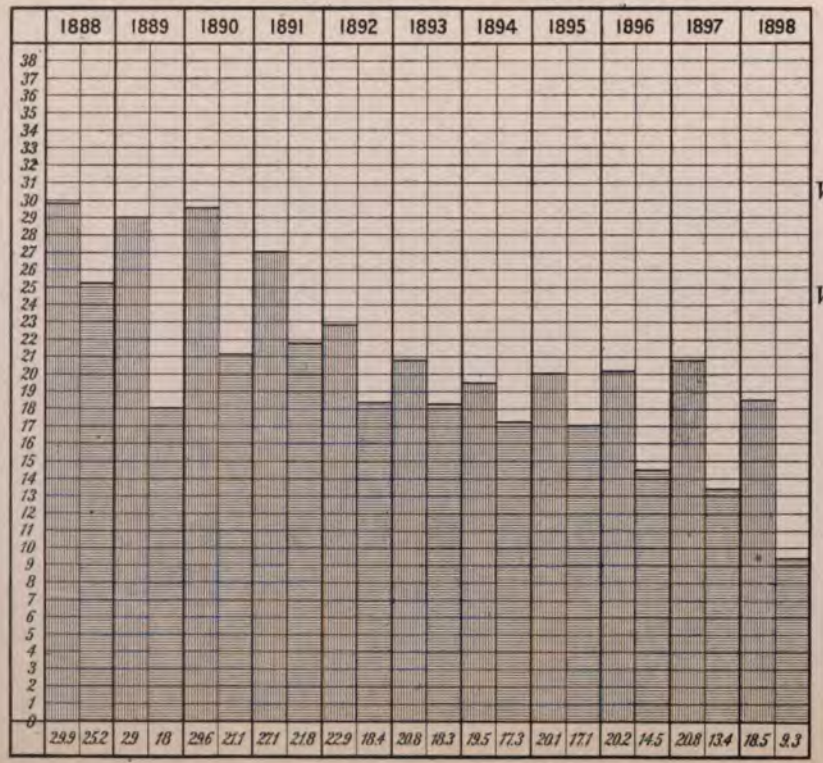
Les chiffres qui ont servi à dresser ce tableau viennent des communes les plus importantes du pays, qui ont envoyé régulièrement (ou à peu près) leurs statistiques, chaque année, au bureau d'hygiène de Bruxelles.

Ce sont : Malines, Boom, Alost, Roulers, Ypres, Hasselt, Marchienne au Pont, Montigny s/Sambre, Verviers, Louvain, Seraing, Borgerhout, Lokeren, Lierre, Turnhout, Bruges, Mons, Charleroi, Jumet et Gilly.

Il est certain que les chiffres recueillis sont inférieurs à la réalité. Un grand nombre de décès dus à la tuberculose ne sont pas mentionnés. C'est ainsi qu'à Jumet, par exemple, on ne mentionne pas un seul cas de carreau en 11 ans, de même à Mons, un seul à Charleroi, 3 à Gilly : soit sur environ 70,000 habitants, 4 cas de carreau en 11 ans. Ce n'est probablement pas le $\frac{1}{10}$ de ce qui existe. Cependant, toutes circonstances égales d'ailleurs, ce tableau montre une augmentation des décès vers 1890, avec une diminution lente qui s'accentue surtout en 1893 et poursuit sa marche jusqu'en 1898.

IV.

Mortalité comparée entre les 8 villes wallonnes et les 11 villes flamandes du tableau N° III, calculée par 10.000 habitants.
(Louvain a été excepté à cause de l'existence de l'Université, amenant beaucoup de Malades étrangers à la ville.)



Villes flamandes

Villes wallonnes

Villes flamandes	Bruges.	Malines.	Hasselt.
	Borgerhout.	Boom.	
	Lokeren.	Alost.	
	Lierre.	Roulers.	
	Turnhout.	Ypres.	
Villes wallonnes	Mons.	Gilly.	
	Charleroi.	Marchienne au Pont.	
	Seraing.	Montigny s/Sambre.	
	Verviers.		
	Jumet.		

Réserves analogues à celles émises précédemment.

Il semble, d'après ceci, que la mortalité est moindre chez les Wallons que chez les Flamands.

Une diminution notable est encore à signaler après 1891.

On ne remarque pas ici la recrudescence ainsi marquée en 1890. Les décès y sont très nombreux. C'est encore presque le point culminant, mais on ne constate pas de poussée.

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Vingt Villes Flamandes et Wallonnes.

	Population.	Tuber.	Prop. par 10,000.
1888	510,446	1,486	29·1
1889	518,917	1,106	21·3
1890	526,790	1,387	26·3
1891	504,128	1,292	23·6
1892	525,238	1,120	21·3
1893	529,927	1,065	20·1
1894	534,210	1,069	20·0
1895	541,189	1,065	19·4
1896	521,939	1,001	19·1
1897	555,735	1,038	18·6
1898	562,094	919	16·3

Huit Villes Wallonnes.

	Population.	Tuber.	Prop. par 10,000.
1888	199,033	502	25·2
1889	203,033	366	18·02
1890	207,032	438	21·1
1891	187,834	409	21·8
1892	207,024	381	18·4
1893	208,765	382	18·3
1894	209,785	363	17·3
1895	212,806	365	17·1
1896	189,928	276	14·9
1897	219,196	294	13·4
1898	220,762	207	9·3

Villes Flamandes moins Louvain.

	Population.	Tuber.	Prop. par 10,000.
1888	271,953	814	29·9
1889	276,185	802	29·03
1890	279,571	828	29·6
1891	275,670	758	27·1
1892	277,526	637	22·9
1893	280,263	584	20·8
1894	283,422	554	19·5
1895	287,229	578	20·1
1896	290,464	587	20·2
1897	294,853	614	20·8
1898	299,426	555	18·5

LA TUBERCULOSE FAMILIALE.

PAR M. LE DR. E. MOSNY, *Médecin des Hôpitaux de Paris.*

DANS le cours d'une année, du 1er mars 1900 au 1er mars 1901, hormis toutefois les deux mois de vacances d'août et de septembre, j'ai systématiquement fait prendre par mes élèves l'observation de tous les tuberculeux qui ont séjourné dans mon service de l'Annexe de l'Hôtel-Dieu de Paris.

Mon service se compose de deux salles comprenant un nombre total de 83 lits d'hommes : mes observations concernent donc uniquement des malades du sexe masculin.

Pendant les dix mois que cette enquête a duré, j'ai pu recueillir 218 observations de malades dûment atteints de lésions tuberculeuses pulmonaires à tous les degrés de leur évolution, mais généralement parvenues à un stade assez avancé de la phtisie, ainsi qu'il est de règle pour les tuberculeux demandant leur admission à l'hôpital.

Je ne veux actuellement entreprendre l'étude synthétique de ces observations qu'au seul point de vue de l'étiologie de chacun des cas et plus particulièrement même au point de vue de la contagion familiale de la tuberculose.

J'ai donc recherché pour chacun de ces 218 tuberculeux ce qu'étaient devenus leurs parents, leurs collatéraux directs, frères et sœurs, et pour ceux qui étaient mariés, leurs femmes et leurs enfants.

Ce sont les résultats de cette enquête que je vais exposer en étudiant la tuberculose tour à tour chez les ascendants, les collatéraux, les femmes et les descendants de ces malades.

Je n'ignore pas les nombreuses causes d'erreurs inhérentes à ce genre de recherches, et je crois utile de les signaler tout d'abord. Il arrive fréquemment que nombre de ces malades de la population hospitalière, ouvriers habitant Paris parfois depuis fort longtemps, ne donnent que des renseignements insuffisants ou incomplets sur leurs parents et surtout sur leurs collatéraux, qu'ils ont souvent perdus de vue depuis longtemps, qu'ils ne voient en tout cas généralement qu'à de rares intervalles.

Les renseignements sont plus exacts, parce que les souvenirs sont plus récents et plus précis, en ce qui concerne la contagion conjugale.

Les résultats de l'enquête sur les descendants des malades sont eux aussi entachés d'erreur, parce que ces tuberculeux sont souvent des sujets jeunes, malades depuis peu de temps, dont la maladie n'a par conséquent pas eu le temps de provoquer chez les descendants les ravages qu'elle court grand risque de déterminer dans la suite. Telles sont les principales causes d'erreur capables de faire attribuer aux résultats bruts d'une statistique une signification qu'ils ne sauraient comporter.

J'ai donc, dans chacun des chapitres envisageant la contagion familiale aux divers points de vue que je vient d'indiquer, éliminé les observations pour

lesquelles les renseignements me paraissaient incomplets ou douteux ; je me suis surtout gardé d'attribuer à la statistique une importance excessive, cherchant surtout dans les cas particuliers, précis, la démonstration de faits que je tiens avant tout à mettre en évidence.

Cette enquête, primitivement basée sur la statistique, aura donc pour résultat d'en révéler les imperfections et les erreurs ; mais elle me permettra aussi de montrer l'intérêt capital, dans une étude sur la propagation familiale de la tuberculose, des faits particuliers, les seuls auxquels il convienne, à mon avis, d'attacher quelque importance.

I.—La Tuberculose chez les Ascendants.

Sur les 218 observations qui m'ont fourni les éléments de cette étude, j'ai dû, en ce qui concerne la tuberculose des parents et des collatéraux, en éliminer 24 pour lesquelles les malades n'ont pu me donner que des renseignements insuffisants ou incomplets : je n'ai donc utilisé que 194 des ces observations.

Dans ces 194 cas, la tuberculose n'existait d'une façon certaine que chez les ascendants de 53 malades, ce qui signifierait que le quart environ des tuberculeux (soit précisément 28·128 pour 100 de ces malades), est issu de parents eux-mêmes tuberculeux. Sur ces 53 cas positifs :

24 fois, soit 45·28 p. 100, le père seul était tuberculeux.
21 „ „ 39·62 p. 100, la mère seule était tuberculeuse.
1 „ „ 15·10 p. 100, le père et la mère étaient tous deux tuberculeux.

Cette proportion pour 100 tuberculeux de 28 malades issus de souche tuberculeuse est notablement inférieure à celle donnée par un grand nombre de statistiques. Elle est évidemment très inférieure à celle qu'ont jadis donnée les partisans de l'hérédité de la phtisie, entre autres Leudet (de Rouen) ; elle est même inférieure à celle plus récemment donnée par J. E. Squire, qui se déclare l'adversaire de l'hérédité de la tuberculose. Et pourtant je la crois encore très supérieure à la réalité des faits, ou, pour mieux dire, je crois qu'elle ne signifie nullement que 28 tuberculeux sur 100 ont été contaminés par leurs parents eux-mêmes tuberculeux. En d'autres termes, l'existence avérée de la tuberculose chez les ascendants, n'implique pas forcément que ce soit là la cause de la contamination des descendants. Les descendants des phtisiques peuvent parfaitement contracter ailleurs que dans le milieu familial le virus qui les a contaminés ; les exemples n'en sont pas rares. Et c'est pour cette raison que j'estime que la fréquence de la contamination des enfants par leurs parents tuberculeux n'est nullement indiquée, même d'une façon approximative, par les statistiques qui donnent le nombre proportionnel des tuberculeux issus de parents atteints de la même affection.

Je n'en veux pour preuve que l'étude des cas de ma propre statistique. En effet la phtisie peut frapper les descendants des tuberculeux dans des conditions très diverses, dont la signification, au point de vue de la contagion familiale, est essentiellement différente selon les cas.

1° Parfois l'époque de la mort des parents tuberculeux est tellement éloignée, la date du début apparent de l'infection bacillaire de leurs enfants si rapprochée, que l'on ne peut vraisemblablement guère admettre que le virus tuberculeux se soit transmis des parents aux enfants par contagion directe dans le milieu familial.

Il est bien difficile dans ces cas d'attribuer l'infection bacillaire des enfants de phtisiques non pas seulement à la contamination intra-utérine, mais même à la contagion familiale, avec une longue période de latence du germe et apparition tardive des premiers symptomes de l'infection tuberculeuse. De tels faits sont réels, mais encore la période du microbisme latent ne peut-elle dépasser certaines limites, une durée de quelques années. Il est même, à mon avis, fort difficile d'admettre que dans ces cas les enfants de souche tuberculeuse aient hérité de leurs parents d'une prédisposition spécifique à l'infection bacillaire, prédisposition dont les conséquences ne se seraient manifestées chez eux qu'à un âge avancé, alors que jusqu'à cet âge, les risques de contamination ne leur ont certainement pas manqué. Et ces cas ne sont pas rares où le long intervalle qui sépare la mort des parents tuberculeux du début de la maladie de leurs rejetons permet de mettre en doute la contamination de deux générations successives par la transmission du virus de l'une à l'autre, où en dépit des données brutales de la statistique, ce ne sont pas toujours les parents tuberculeux qui ont contagionné leurs enfants très tardivement contaminés. Ainsi sur 53 observations de malades dont les parents étaient incontestablement tuberculeux, nous voyons que dans près de la moitié des cas (25 cas sur 53, soit 47·17 p. 100) les parents tuberculeux sont morts plus de vingt ans avant le début de la maladie de leurs enfants. Et ces enfants, qui sont précisément les malades qui font le sujet de mes observations, ont pour la plupart atteint un âge supérieur à l'âge moyen des tuberculeux ; cinq d'entre eux ont dépassé 30 ans ; neuf sont âgés de 40 à 50 ans ; neuf ont dépassé 50 ans ; deux seulement sont âgés de 24 et de 27 ans. Chez aucun de ces malades, le début de l'infection bacillaire ne paraissait remonter à plus de trois ans. On ne peut donc invoquer, chez ces malades, en faveur de leur contamination par leurs parents, une atténuation de l'infection bacillaire qui comporterait une évolution lente des lésions et s'expliquerait, ainsi que d'ancuns l'ont prétendu, par une immunité relative des rejetons de souche tuberculeuse à l'égard de l'infection bacillaire. Parfois d'ailleurs, dans ces cas on trouve une cause tellement évidente de contamination qu'il serait illogique d'incriminer la tuberculose des parents morts depuis plus de 20 ans.

Le plus souvent alors c'est de contagion conjugale qu'il s'agit ; d' autrefois, c'est dans un atelier, dans un bureau, près de camarades tuberculeux, que le malade a, selon toute vraisemblance, contracté la tuberculose.

Il est bien évident, d'ailleurs, qu'il ne peut s'agir que de probabilités dans l'appréciation de l'origine d'une infection bacillaire chez un sujet de souche tuberculeuse pris dans les conditions que je viens d'indiquer. Il ne faudrait pas, s'appuyant sur les quelques cas que je viens de citer, refuser à la tuberculose une évolution latente, très longue, parfois même prolongée pendant un

grand nombre d'années et pouvant par sa prolongation même, si l'on n'apporte le plus grand soin dans l'examen du malade, et l'étude minutieuse des moindres accidents de tuberculose larvée qu'il a pu présenter, faire méconnaître le début réel de l'infection bacillaire. Aussi n'est-il pas rare de constater que chez certains malades, en dépit de la date parfois fort éloignée de la mort de leurs parents tuberculeux, leur propre tuberculose s'est depuis si longtemps manifestée par des accidents larvés, mais de nature incontestablement tuberculeuse, que leur contamination peut bien selon toute vraisemblance avoir comme origine la maladie de leurs parents. Peut-être peut on expliquer par cette longue latence de l'infection ce cas d'un de mes malades qui sept ans après la mort de sa mère tuberculeuse voit soudain éclater les premiers symptômes d'une tuberculose à marche rapide à la suite d'une plaie pénétrante de poitrine. Dans certain cas enfin, il semble que si les parents tuberculeux n'ont pas transmis par contagion le virus à leurs enfants, ils leur ont transmis néanmoins un terrain particulièrement favorable à la contamination bacillaire. Tels sont ces familles dont les ascendants tuberculeux sont morts depuis trop longtemps pour que l'on puisse incriminer la transmission par contagion du virus d'une génération à l'autre, mais où l'extrême fréquence de la tuberculose chez les collatéraux d'une même génération éveille fatalement l'idée d'un terrain plus tuberculisable.

Je me suis déjà longuement expliqué sur ces faits, j'en ai discuté la pathogénie, et j'ai dit pour quelles raisons l'hérédité du terrain tuberculisable me paraissait absolument indépendante de la tuberculose des parents. Les parents transmettent à leurs enfants, avec la ressemblance physique, et au même titre qu'elle, une constitution particulière qui dans certains cas présente, entre autres caractères, celui d'une aptitude spéciale à contracter la tuberculose. Chez ces familles tuberculisables la tuberculose n'éclate que lorsque l'occasion de la contracter s'est fortuitement trouvée réalisée pour l'une quelconque de ses générations successives. La famille tuberculisable devient la famille tuberculeuse, presque fatalement vouée à la disparition complète au bout d'un nombre de générations généralement assez restreint.

J'aurai d'ailleurs à revenir dans le cours de cette étude sur la *Famille Tuberculeuse.*

2° À côté de cette catégorie de faits où, en dépit de la tuberculose des ascendants, l'infection bacillaire des rejetons peut reconnaître une toute autre origine, il est une autre classe de faits, qui dans mes observations se présente numériquement égale à la précédente (28 cas sur 53, soit 52·83 pour 100) et dans laquelle la tuberculose des enfants peut, et doit dans le plus grand nombre des cas, reconnaître pour origine la tuberculose des parents.

Il s'agit alors de parents tuberculeux actuellement encore vivants, ou morts récemment, dont un ou plusieurs enfants sont atteints de tuberculose. On peut alors selon l'âge de ces derniers et l'époque du début de leurs lésions invoquer soit une contamination fœtale avec latence plus ou moins prolongée de l'infection bacillaire, soit la transmission par contagion *post partum.*

Les recherches nombreuses et généralement concordantes sur l'hérédité de

la tuberculose nous engagent à nous rallier à cette dernière hypothèse qui sauf de très rares exceptions explique presque la totalité des cas de phtisie familiale.

Mais, même dans ces conditions où la contamination des enfants par leurs parents semble presque incontestable, il n'est pas rare de constater qu'il existe une autre cause de contamination plus récente, plus immédiate et partant plus probable ; et c'est généralement alors de contagion conjugale qu'il s'agit.

En somme, on ne doit jamais, en dépit des apparences et malgré la fréquence de la tuberculose dans certaines familles, malgré l'infection bacillaire des parents, conclure à la contamination certaine des enfants par leurs parents tuberculeux.

Les statistiques n'envisagent que les chiffres sans entrer dans l'étude détaillée des faits ; elles ont à ce point de vue rendu les pires services, et ont en maintes circonstances permis de donner aux faits une interprétation erronée. Nul doute que ce ne soit là la principale cause de la croyance si générale, si tenace, et pourtant si peu justifiée, à l'hérédité de la phtisie.

II.—La Tuberculose chez les Collatéraux.

J'ai dit, dès le début de cette étude, combien nombreuses et graves étaient les causes d'erreur dans la recherche de la tuberculose chez les collatéraux des malades traités à l'hôpital. Aussi bien n'insisterai-je pas longuement sur le chapitre concernant cette étude.

Les collatéraux des 194 malades étudiés au point de vue de la recherche de la tuberculose chez leurs parents ou leurs collatéraux directs, comprennent, en comptant ces 194 malades eux-mêmes, 1009 sujets, parmi lesquels :

264 sont morts de causes diverses autre que la tuberculose ;
289, soit 18·83 p. 100, sont morts en bas âge ;*
456, soit 25·37 p. 100, sont devenus tuberculeux.

Si nous cherchons par quelles particularités peut se différencier l'avenir des familles dont les ascendants sont tuberculeux de l'avenir de celles dont les ascendants sont indemnes de toute manifestation bacillaire, nous constatons que :

1° Cinquante-trois familles dont les ascendants sont tuberculeux, celles-mêmes qui ont fait l'objet du chapitre précédent, ont eu 236 enfants, parmi lesquels :—

26 sont morts de causes diverses autres que la tuberculose.
46, soit 19·50 p. 100, sont morts en bas-âge.
87, soit 36·86 p. 100, sont devenus tuberculeux.

2° Cent quarante et une familles dont les ascendants sont indemnes de tuberculose, ont eu 773 enfants, parmi lesquels :—

138 sont morts de causes diverses autres que la tuberculose.
143, soit 18·50 p. 100, sont morts en bas-âge.
169, soit 22·76 p. 100, sont devenus tuberculeux.

* Je désigne sous cette rubrique et désignerai désormais ainsi, dans le cours de cette étude, les enfants décédés avant la fin de la 2ᵉ année, et dont la mort, sans cause déterminée, est attribuée par les parents à la débilité congénitale.

La seule particularité digne de remarque qui permette de différencier l'un de l'autre deux groupes, consiste précisément dans la fréquence notablement plus grande de la tuberculose chez les rejetons de souche tuberculeuse (36·86 pour 100) que chez les enfants de parents non-tuberculeux (22·76 pour 100). C'est là d'ailleurs un résultat qui ne nous surprend pas, mais que la contagion familiale suffit à expliquer sans qu'il soit nécessaire d'invoquer l'hérédité du germe, ni-même l'hérédo-prédisposition. On peut même dire que si la contagion familiale justifie la plus grande fréquence de la tuberculose chez les rejetons des tuberculeux, l'hypothèse de l'hérédité du germe ou même du terrain ne s'accorderait pas avec un si faible excès de fréquence de la tuberculose chez les enfants de souche bacillaire.

Nous verrons, dans un instant, lorsque nous étudierons l'avenir des descendants de nos malades, que nos statistiques ont la même signification, et que toutes proportions gardées, les résultats sont analogues, la moindre durée de l'observation dans l'étude de la descendance de malades encore jeunes, expliquant les proportions moins élevées des résultats obtenus.

III.—La Contagion Conjugale.

La recherche chez mes malades, des cas de contamination conjugale, est celle qui m'a donné les résultats les plus indiscutables, parce que les renseignements sont très précis, et la constatation facile; et les résultats les plus instructifs parce qu'ils nous révèlent l'extrême fréquence de la contagion conjugale.

Sur mes 218 malades, j'ai pu recueillir l'observation de 110 ménages légitimes ou illégitimes. J'en passerai six sous silence parce qu'il s'agit d'unions ayant duré moins de six mois, trop éphémères par conséquent pour que les renseignements obtenus puissent avoir quelque valeur.

Cette étude ne porte donc que sur 104 ménages légitimes ou non que je n'ai pas cru devoir distinguer à ce point de vue les uns des autres, la contagion conjugale n'ayant aucun rapport avec la légitimité ou l'illégitimité de l'union des époux.

Sur ces 104 ménages légitimes ou non, j'ai trouvé 34 cas de contagion conjugale, et 70 autres cas où cette contagion ne s'était pas réalisée. Cela signifie en somme que dans un ménage où l'un des deux époux est phtisique, celui-ci contamine l'autre dans 38 pour 100 des cas, et 67 fois sur 100 ne le contamine pas. Tel est le résultat brut de la statistique; il nous révèle déjà une très grande fréquence de la contagion conjugale, mais il la révèle encore moins grande qu'elle n'est en réalité ainsi que va nous le démontrer l'étude détaillée des faits particuliers.

I.—Les faits positifs de contagion conjugale, qui sont au nombre de 34 (soit 32·60 p. 100), sont tous incontestables, et je ne les discuterai pas longuement. J'ai plus fréquemment trouvé la transmission du mari à la femme que la transmission inverse, mait cela tient à ce que toutes mes observations concernent des hommes; je n'y attache par conséquent pas la moindre importance. Souvent on voit un mari contaminé par sa femme veuve d'un

premier mari mort tuberculeux, ou bien un mari veuf transmettre à sa seconde femme la tuberculose qu'il a reçue de la première. Et l'étude minutieuse des faits permet en maintes circonstances de constater que les tuberculoses les plus torpides, les plus silencieuses, les plus longues ne sont pas les moins dangereuses au point de vue de la contamination conjugale. Dans quelques cas la mort de la femme tuberculeuse remonte à une époque si lointaine que l'on pourrait douter que ce soit elle qui ait réellement contaminé son mari. Mais dans tous les cas analogues que j'ai pu observer, il s'agissait toujours, chez mes malades, d'hommes âgés chez lesquels la tuberculose revêtait une forme fibrieuse pulmonaire ou pleuro-pulmonaire, à évolution lente et torpide, et par conséquent compatible avec une période de latence parfois extrêmement prolongée. J'estime donc qu'il est dans ces cas logique d'admettre que la tuberculose du mari reconnaît pour origine la contamination conjugale. Je n'ai trouvé qu'un seul cas où cette origine conjugale pût, selon toute vraisemblance, être mise en doute.

II.—Dans les 70 cas où la tuberculose ne s'est pas transmise du mari à la femme (67·40 pour 100 des cas), il est aisé de constater que la plupart du temps, la contagion ne s'est pas faite parce qu'elle n'a pas eu le temps de se réaliser, parce qu'elle ne pouvait matériellement pas se faire, ou parce que si elle s'est faite, nous n'en pouvons pour maintes raisons rien savoir.

Il s'agit en effet de cas où la femme a depuis longtemps succombé à une maladie qui n'était pas la tuberculose, tandis que son mari ne présente que depuis peu de temps les symptômes d'une tuberculose à évolution ulcéreuse plus ou moins rapide. Il peut aussi s'agir de femmes mortes depuis peu de temps de maladies toutes différentes de la tuberculose et que le mari, malade depuis peu de temps, n'a pas pu contaminer.

Dans d'autres cas enfin où la femme est encore vivante, elle vit séparée de son mari depuis un temps plus ou moins long et a pu être contaminée sans que nous en puissions rien savoir : où bien encore elle est mariée depuis trop peu de temps, ou le début de la tuberculose du mari est de date trop récente pour que la contamination conjugale ait eu le temps de se réaliser ou celui de se manifester.

Tous ces faits sont loin d'être exceptionnels, puisque sur les 70 cas où la contagion conjugale ne s'était pas manifestée j'ai constaté que :—

28 fois la contagion n'avait pas eu le temps de se faire ou de se révèler.
8 fois elle a fort bien pu se faire, mais nous n'avons pas pu le savoir.
34 fois elle aurait pu se faire, et nous l'aurions su, mais elle ne s'est pas réalisée.

En somme il n'y a guère que dans la moitié des cas négatifs de contagion conjugale que la contamination ayant pu se faire ne s'est pas réalisée. Et l'on comprend que cette considération nous autorise à regarder la transmission conjugale de la tuberculose comme plus fréquente encore que ne l'indiquait le résultat brut de notre statistique (32·60 pour 100), puisqu'en effet, si nous ne faisons pas entrer en ligne de compte les 28 ménages où cette transmission ne s'est pas faite parce qu'elle ne pouvait matériellement pas se faire, nous

voyons que sur 76 ménages (au lieu de 104) où elle était réalisable, elle s'est manifestée dans 34 cas, soit dans 44·73 p. 100 (près de la moitié) des cas.

Il est bien évident, que pour si fréquente qu'elle soit, la contamination conjugale n'est ni fatale ni même constante, et j'ai quelques cas où le mari depuis longtemps marié et depuis longtemps malade, ne contaminait pas sa femme, d'autres cas où un mari ayant contaminé sa première femme ou contaminé par elle, ne transmettait pas à sa seconde femme la tuberculose qu'il avait transmise à la première ou qu'il avait reçue d'elle. Cela prouve seulement que si intimes et si constants que soient les contacts, la tuberculose peut dans des cas encore assez nombreux ne pas se transmettre des malades aux sujets sains, mais ces exemples ne peuvent en aucune façon permettre de révoquer en doute l'extrême fréquence de la contagion conjugale de la tuberculose, la plus fréquente des manifestations de la transmission familiale.

IV.—La Descendance des Tuberculeux.

Sur les 104 ménages légitimes ou non, qui ont été unis pendant un temps suffisamment long pour avoir des enfants et pour les contaminer, nous en trouvons 74 féconds et 30 stériles. Rien à dire des ménages stériles, sinon que chez 24 d'entre eux, le mari seul était tuberculeux ; et que dans 6 cas seulement, les deux époux étaient tuberculeux. Constatation à laquelle je ne crois d'ailleurs pas devoir attacher la moindre signification.

L'enquête sur la descendance des 74 ménages féconds n'est pas sans intérêt ; mais les résultats n'en sont pas non plus inattaquables.

Souvent en effet, nos tuberculeux sont jeunes, mariés depuis peu de temps, n'ont pas encore eu tous les enfants qu'ils pourront avoir, n'ont pas encore contaminé tous ceux de leurs enfants qui sont contaminables, et dont plusieurs peut-être ne seront que plus ou moins tardivement atteints.

Je me garderai donc bien dans cette enquête comme dans les précédentes d'attribuer aux chiffres une valeur absolue. C'est ainsi que le nombre des enfants devenus tuberculeux est certainement dans mon enquête bien inférieur à ce qu'il est dans la réalité parce que nombre des enfants de mes ménages tuberculeux n'ont pas dépassé la quinzième année, et que pour eux la contagion par les parents pourra se faire ou se révéler beaucoup plus tard.

Les nombres absolu et proportionnel des enfants morts en bas-âge sont plus importants, parce qu'ils sont plus conformes à la réalité.

Ils nous indiquent d'une façon assez exacte la fréquence de la mortalité précoce chez les descendants des tuberculeux qui si souvent succombent avant la fin de la deuxième année, généralement même dans les premiers mois de la vie, sans cause appréciable, sans symptômes ou sans lésions nettement précisés, et dont le décès est habituellement classé sous la rubrique *débilité congénitale*. C'est l'une des manifestations les plus fréquentes de l'hérédo-dystrophie para-tuberculeuse, et nous allons voir que les résultats de mon enquête sont, à ce point de vue, des plus significatifs.

Voici d'abord l'indication globale de ce que sont devenus les rejetons issus de 74 ménages féconds de tuberculeux :—

23 fausses-couches (9·09 sur 100 grossesses).
236 enfants nés viables.
20 enfants morts d'affections diverses, mais non de tuberculose.
89 enfants morts de 1 à 2 ans (37·71 p. 100 nés viables).
18 enfants morts de 2 à 10 ans.
11 enfants morts ou devenus tuberculeux (4·66 pour 100 nés viables).
103 enfants survivants et non-tuberculeux (46·18 p. 100 nés viables).

Cela nous indique déjà que la moitié à peine des enfants de nos tuberculeux a survécu et n'a pas été contaminée ; et que hormis les décès dûs à diverses affections non-tuberculeuses, un grand nombre de leurs enfants nés viables, soit plus du tiers, a succombé dans les deux premières années de la vie, tandis que peu d'entre eux sont devenus tuberculeux.

Si nous recherchons dans ces 74 ménages féconds, quelle peut être l'importance sur l'avenir de la descendance de la tuberculose du père seul ou des deux géniteurs, nous voyons, de la façon la plus nette, s'accroître le nombre des tares dystrophiques congénitales (avortements, mortalité précoce) et les risques de contagion lorsque les parents sont tous deux tuberculeux.

Dans ces 74 ménages, 47 fois le mari seul était tuberculeux, 27 fois le mari et la femme étaient tous deux infectés.

Les 47 ménages dans lesquels le mari était seul atteint de tuberculose ont donné :—

9 fausses-couches (5·69 sur 109 grossesses).
149 enfants nés viables.
16 enfants morts d'affections diverses mais non de tuberculose.
50 enfants morts de 1 à 2 ans (33·55 pour 100 nés viables).
10 enfants morts de 2 à 10 ans.
2 enfants morts ou devenus tuberculeux (1·34 pour 100 nés viables).
71 enfants survivants et non-tuberculeux (47·65 pour 100 nés viables).

Les 27 ménages dans lesquels mari et femme étaient tous deux tuberculeux ont donné :—

14 fausses-couches (14 sur 100 grossesses).
87 enfants nés viables.
4 enfants morts d'affections diverses, mais non de tuberculose.
39 enfants de 1 à 2 ans (44·83 p. 100 nés viables).
3 enfants de 2 à 10 ans.
9 enfants morts ou devenus tuberculeux (10·34 p. 100 nés viables).
32 enfants survivants et non-tuberculeux (36·78 p. 100 nés viables).

Cela nous enseigne qu'en somme les manifestations générales et précoces de l'hérédo-dystrophie paratuberculeuse (avortement et mortalité infantile prématurée) et la contamination tuberculeuse des enfants sont d'autant plus fréquentes dans les ménages tuberculeux que les deux parents sont infectés. Et si l'on veut même faire abstraction des cas de contagion bacillaire, que nous ne pouvons, dans les conditions de notre enquête, apprécier à sa juste valeur, nous constatons dans la descendance des tuberculeux une fréquence

des avortements, et surtout de la mortalité infantile, qui ne peut s'expliquer que par l'influence, sur le produit de la conception, de l'infection bacillaire des parents.

D'ailleurs, ainsi que je le disais au début de ce travail, les faits valent mieux que les statistiques globales, et sur mes observations s'en trouvent quelques-unes où les enfants succombent presque tous avant d'avoir atteint le terme de la 2e année.

Quatre familles où le père seul était tuberculeux ont 33 enfants parmi lesquels 26, soit 78·78 p. 100, meurent avant l'âge de 2 ans. Six familles où le père et la mère sont tous deux tuberculeux ont 29 enfants dont 23, soit 79·31 p. 100, succombent avant la deuxième année.

Que les deux parents ou le père seul soient tuberculeux, la proportion de la mortalité précoce dans les deux premières années de la vie est à peu près la même; et elle est effrayante puisque nous voyons dans certaines familles les quatre cinquièmes des enfants succomber prématurément dès les premiers mois de l'existence.

Tels sont les faits que malgré ses imperfections notre enquête met nettement en évidence; elle montre l'extrême gravité des conséquences sociales de la tuberculose, qui compromet à un tel point l'avenir de la race!

D'autres faits d'importance secondaire nous sont révélés par l'étude détaillée des observations; je les indiquerai en quelques mots.

La mortalité précoce des rejetons des phtisiques est un peu plus fréquente dans les cas où le père et la mère sont tous deux tuberculeux, que dans le cas où le père seul est malade; l'influence de la mère paraît donc être prépondérante. Mais il est incontestable que la tuberculose du père seul en est souvent la cause, car dans nombre de cas elle seule peut être incriminée.

Il y a certains cas où la mortalité précoce des rejetons se manifeste très exactement dès le début de la tuberculose des parents, et frappe très régulièrement dans la lignée des descendants tous ceux dont la naissance est postérieure au début de la maladie des ascendants. Mais ce fait est loin d'être constant; la mortalité précoce ne frappe que ceux qui naissent après le début de la tuberculose des parents, mais elle ne les frappe pas tous; quelques-uns survivent et il semble que ceux qui sont épargnés sont précisément ceux dont la procréation coïncide avec une trêve dans l'évolution de la tuberculose des parents. Et cela nous explique l'alternance fréquente dans la lignée des descendants des tuberculeux, de la naissance d'enfants sains et vigoureux qui survivent, et d'enfants chétifs ou malformés qui succombent dès les premiers mois de la vie.

Il est assez surprenant de voir dans ces statistiques, combien est faible la proportion des rejetons de phtisiques, eux-mêmes devenus tuberculeux.

C'est qu'en effet la contagion tuberculeuse n'a pas encore donné tout ce dont elle est capable; les enfants des tuberculeux sur lesquels porte mon enquête sont trop jeunes, n'ont pour la plupart pas atteint l'âge de la puberté, n'ont pas, en un mot, donné la mesure de leur *contaminabilité*.

D'autre part, ainsi que je le disais plus haut, il est bien évident qu'un certain nombre des enfants morts prématurément avant la fin de la deuxième

année, n'est pas seulement mort de débilité congénitale, mais a dû succomber aux atteintes de la tuberculose.

Quoi qu'il en soit, cette recherche sur la tuberculose des rejetons de phtisiques nous montre, d'accord avec notre étude sur la tuberculose des collatéraux de nos malades, de souche tuberculeuse, que la transmission de l'infection bacillaire des parents aux enfants est loin d'être la règle ; nouvelle preuve à l'encontre de l'hérédité du germe, voir même de l'hérédo-prédisposition. Il est pourtant certaines familles où la contamination des enfants par les parents tuberculeux est exceptionnellement fréquente ; tel l'exemple d'un de mes malades qui a contaminé sa femme ; le ménage eut sept enfants dont quatre morts tuberculeux, et la femme a fait cinq fausses-couches.

Ces familles vouées à la tuberculose sont assez rares, relativement du moins au grand nombre des phtisiques, et j'en vais faire une étude rapide pour bien montrer ce que j'entends par cette dénomination de *famille tuberculeuse.*

Mais avant d'aborder cette étude, je veux en terminant celle de la tuberculose familiale, faire observer que ce ne sont souvent pas les tuberculoses les plus rapides qui sont les plus dangereuses au point de vue de la contagion familiale. L'expérience nous enseigne que maintes fois les tuberculoses lentes, torpides, avec trêves prolongées, peu dangereuses pour l'individu, voire même curables ou guéries après une évolution plus ou moins longue, sont les plus dangereuses au point de vue de la contamination familiale. Elles sont d'autant plus dangereuses que l'on s'en méfie moins, qu'elles sont assez fréquemment méconnues et que la dissémination du contage est plus longtemps prolongée.

V.—La Famille Tuberculeuse

On voit parfois certaines familles de souche saine et vigoureuse que la tuberculose frappe soudain et qu'elle anéantit parfois sous ses coups répétés ; ce sont là vraiment, dirait-on, des familles vouées à la phtisie. Ce sont précisément ces cas qui ont donné naissance à l'opinion si universellement répandue, si tenace et pourtant si peu justifiée, de l'hérédité de la tuberculose ; et nous devons bien reconnaître que tout semble confirmer cette hypothèse.

Mais avant d'aborder la discussion de l'interprétation des faits, je tiens à citer un exemple qui fera très nettement comprendre ce que c'est qu'une famille tuberculeuse, et montrera les difficultés de l'interprétation pathogénique.

Un homme de 60 ans a perdu son père mort d'accident à l'âge de 54 ans, sa mère mourut en 1883, à 57 ans, des suites d'une pleurésie qui dura 2 mois et fut ponctionnée ; notre malade avait alors 43 ans, et n'habitait pas avec sa mère. Les oncles et tantes du coté paternel sont actuellement vivants, très âgés, bien portants. Deux oncles du coté maternel sont morts à 47 et 50 ans, de fluxions de poitrine qui auraient duré plus de 2 mois et pour lesquelles nous sommes en droit de soupçonner la tuberculose.

Notre malade n'eut jamais qu'un seul frère actuellement âgé de 59 ans et qui serait atteint depuis 1887 d'une maladie de foie qu'il est impossible de

préciser. Il est veuf: sa femme mourut phtisique à 46 ans, in 1892, après 5 ans de maladie. Le ménage eut 7 enfants: un fils aîné mort phtisique à 17 ans, en 1881, après un an de maladie; deux jumeaux dont l'un âgé de 27 ans est bien portant et fait actuellement partie comme soldat du corps d'occupation de Madagascar; l'autre est mort phtisique en 1895, à 21 ans, après 2 ans de maladie; une fille de 5 ans mourut également tuberculeuse en 1889, et un fils de 14 ans en 1891. Il n'y a que deux enfants survivants: une fille de 12 ans et une autre de 11 ans, toutes deux bien portantes. En outre la femme de notre malade fit cinq fausses-couches, entremêlées entre les naissances à terme des 7 enfants; mais toutes avant la naissance du septième enfant.

Notre malade n'est pas syphilitique; il n'eut que la fièvre typhoïde a 21 ans. Sa tuberculose débuta il y a 18 mois par de la toux accompagnée d'expectoration sanglante. Il y a un an débuta une coxalgie de la hanche gauche.

Actuellement on perçoit des craquements aux sommets des deux poumons, des frottements pleuraux à la base du poumon gauche; pas de fièvre, pas de bacilles dans les crachats. Il s'agit bien là d'une tuberculose à évolution torpide, ainsi que cela est fréquent à l'âge de ce malade. L'histoire pathologique de cette famille est bien celle d'une famille tuberculeuse; notre malade, dont la mère, et très probablement les deux oncles du coté maternel, ont succombé à la tuberculose, se trouve par conséquent dans les meilleurs conditions possibles pour naître prédisposé à la tuberculose, si non pour la contracter de sa mère morte à un âge trop avancé, et alors qu'il n'habitait plus depuis longtemps avec elle; pourtant il n'est contaminé qu'à un âge avancé par sa femme, qui sur 12 grossesses fait 5 fausses-couches, a une grossesse gémellaire, et sur 7 enfants nés à terme, en voit 4 succomber à la tuberculose.

C'est là l'histoire de nombre de familles tuberculeuses. On ne le peut expliquer que par l' hérédité du germe, ce qui n'est plus guère admis, et ce qui ne s'accorderait guère, dans ce cas, avec l'éclosion tardive, chez notre malade, d'accidents atténués, torpides, par l'hérédité de prédisposition, ou par la contagion familiale.

L'hypothèse de la prédisposition héréditaire à la tuberculose, des rejetons de phtisiques, a longtemps été en faveur. Je la crois possible, car elle est vraisemblable, et peut seule expliquer l'histoire des familles tuberculeuses, dont les descendants sont successivement frappés et succombent tour à tour à la phtisie dont ils ont souvent contracté le germe ailleurs que dans le milieu familial et à des sources différentes. Encore dois-je m'expliquer sur la nature de cette hérédo-prédisposition. J'estime en effet que l'on doit entendre par là un tempérament morbide, une diathèse absolument indépendante de la tuberculose des parents, une réceptivité pour le germe tuberculeux, comparable à la réceptivité naturelle de certaines espèces, de certaines races, de certaines familles, pour telles autres infections déterminées, et que les parents transmettent à leurs enfants au même titre que la ressemblance physique.

La pathologie humaine ou animale, l'expérimentation nous donnent maints exemples d'immunité ou de réceptivité naturelles d'espèces, de races, de

variétés, à l'égard de certaines infections ou intoxications déterminées. L'exagération de cette réceptivité ou de cette immunité naturelles à certaines races se peut parfois constater dans certaines familles; la tuberculose en fournit de nombreux exemples: il y a nombre de *familles nées tuberculisables* qui n'attendent pour devenir des *familles tuberculeuses* qu'une occasion favorable à la contamination bacillaire.

M. Lœffler, au congrès de la tuberculose tenu à Berlin en 1899, a rapporté deux exemples remarquables de familles tuberculeuses, et je n'hésite pas à attribuer à la prédisposition innée de ces familles à la tuberculose, un rôle important qu'il ne semble pourtant guère admettre. Mais cette prédisposition innée à la tuberculose est si évidemment indépendante de toute infection bacillaire des parents qu'il est fréquent de voir l'infection éclore dans une famille absolument indemne de toute lésion bacillaire, et la décimer ou même l'anéantir.

C'est ainsi que j'ai recueilli l'histoire de huit familles dont les ascendants immédiats (père et mère) étaient indemnes de tuberculose, et qui n'en ont pas moins donné naissance à 28 enfants, sur lesquels 19, soit 68 pour 100, sont morts phtisiques ou devenus tuberculeux.

Au Congrès d'Hygiène tenu à Paris en 1900, M. Klaus Hansen, de Bergen, rapporta l'histoire de l'éclosion de la tuberculose dans certains districts de la Norwège où elle était jusqu'alors inconnue; il observa que dans certaines familles, la phtisie ne faisait qu'un nombre très restreint de victimes alors quelle en décimait certaines autres au point de les anéantir. Tout cela démontre bien que certaines familles sont plus réceptives que d'autres à la contamination bacillaire, qu'il y a des familles tuberculisables, qu'une union malheureuse peut parfois rendre telles en conférant la réceptivité bacillaire à un terrain qui ne l'avait pas.

Vienne alors le bacille, et la famille tuberculisable devient la famille tuberculeuse. Mais il est bien évident que même pour ces familles prédisposées, la contagion joue toujours le rôle capital dans l'éclosion et la dissémination du virus. Il est même nombre de cas où la contagion joue le seul rôle, sans qu'il soit nécessaire d'invoquer une prédisposition que rien ne peut prouver.

Ces familles tuberculeuses peuvent à leur tour faire souche de rejetons tuberculisables, non parce qu'ils sont spécifiquement prédisposés, mais parce qu'ils naissent chétifs malformés, porteurs de tares hérédo-dyphtrophiques que leur a imposée la maladie des parents, et qui les rendent plus réceptifs à la contagion bacillaire dont les risques sont excessifs dans le milieu familial contaminé. En somme il y a certaines familles où la tuberculose ne fait que de rares victimes, et où son éclosion n'entraîne ni la contagion conjugale, ni la contamination des collatéraux; où son apparition n'engage en aucune façon l'avenir de la race.

Mais il en est d'autres, véritables *familles tuberculeuses* où la phtisie une fois entrée fait successivement succomber à ses coups tous ou presque tous les membres de la famille. Généralement la contagion familiale joue le principal et parfois le seul rôle, dans l'histoire pathologique des familles tuberculeuses. D'autre fois pourtant intervient à titre de condition adjuvante

à la contagion tuberculeuse d'origine familiale ou extra-familiale, une prédisposition innée à la tuberculisation indépendante de l'infection bacillaire des parents ou créée très indirectement par elle lorsqu'elle fait de leurs descendants des êtres débiles ou malformés qu'elle expose sans défense à toutes les infections et en particulier à la contagion bacillaire, de toutes la plus menaçante dans un milieu familial contaminé.

VI.—Conclusions.

En résumé, le dossier familial des tuberculeux est le document le plus instructif, le plus fécond en enseignements, qui se puisse consulter sur la contagion de la tuberculose et sur les conditions de sa propagation.

La recherche de la fréquence de la phtisie chez les parents des malades nous enseigne tout d'abord que plus des deux tiers des tuberculeux (71·87 p. 100) ne sont pas issus de souches tuberculeuses. Encore cette proportion doit-elle être considérée comme n'indiquant nullement la fréquence de la contamination des enfants par leurs parents, puisque maintes observations nous démontrent que tout en étant issus de parents tuberculeux, nombre d'enfants ne peuvent matériellement pas avoir contracté de leurs parents la tuberculose dont ils sont atteints.

La fréquence de la tuberculose chez les collatéraux directs (frères et sœurs) des malades est encore inférieure à celle de la tuberculose chez leurs parents. Il n'y a guère que le quart des tuberculeux (25·37 pour 100) qui aient des collatéraux atteints de la même affection.

Mais il convient d'ajouter que si cette proportion s'abaisse encore au dessous du quart (22·76 pour 100) lorsque les parents ne sont pas tuberculeux, par contre elle s'élève jusqu'au dessus du tiers (36·86 pour 100) chez les malades issus de souches tuberculeuses. La recherche de la fréquence de la contagion conjugale semble au premier abord donner les mêmes résultats, puisque nous la constatons dans le tiers des ménages où l'un des deux époux est tuberculeux. Mais en réalité cette proportion est beaucoup plus élevée que ne l'indique la statistique, et elle le serait bien davantage si dans chaque ménage la contamination avait toujours le temps de se faire ou celui de se révéler; aussi voyons-nous dans ces conditions la contagion se manifester dans la moitié des ménages où l'un des deux époux est tuberculeux. Ainsi la contagion conjugale nous apparaît comme le mode le plus fréquent de la propagation familiale de la phtisie.

Les tuberculeux font souvent souche de tuberculeux, mais dans une proportion bien inférieure à celle qu'exigerait l'hérédité de la phtisie. La contagion suffit à cette tâche, elle est l'explication nécessaire et suffisante des cas de transmission du virus tuberculeux par les parents à leurs enfants. Les enfants des phtisiques sont bien plus fréquemment voués à la mort prématurée, dans les premiers mois de la vie qu'ils ne le sont à la contamination bacillaire. Quelle que soit la cause de cette multiléthalité infantile, que ce soit la débilité congénitale sans lésions tuberculeuses, ce qui est certain pour un bon nombre de cas, ou que ce soit des manifestations frustes de la tuberculose, ce qui en

d'autres cas est possible, il n'en demeure pas moins évident que les ménages tuberculeux voient le tiers (33·55 pour 100) de leurs enfants succomber avant la fin de leur deuxième année lorsque le père seul est tuberculeux, et près de la moitié (44·83 pour 100) lorsque le père et la mère sont tous deux tuberculeux.

En somme la contagion familiale est, à elle seule, la cause du tiers environ des cas de tuberculose ; la fréquence de la contagion conjugule dépasse de beaucoup cette proportion et nous démontre qu'en règle générale, la contagion de la tuberculose dans le milieu familial est d'autant plus fréquente que les sources du virus sont plus nombreuses, les contacts plus incessants, plus intimes, plus prolongés.

Parfois la tuberculose décime certaines familles, voire même jusqu'à leur complet anéantissement. Peut-être s'agit-il là d'une prédisposition à la contamination bacillaire ; prédisposition innée, en tous cas indépendante de la tuberculose des parents, et dont l'importance dans la propagation de la tuberculose s'efface devant le rôle incontestablement prépondérant de la contagion.

L'enseignement que nous donne l'étude de la tuberculose dans la famille doit avoir une sanction ; ce ne doit pas être en vain que l'observation nous révèle la fréquence de la contagion familiale de la tuberculose, la gravité de ses conséquences sur l'avenir des descendants. Ces notions doivent dicter ses conseils au médecin consulté sur l'opportunité du mariage d'un tuberculeux, à l'hygiéniste les mesures prophylactiques que comporte la préservation d'un famille dont l'un des membres est atteint de tuberculose. Je dois d'ailleurs insister sur la nécessité de conseils sévères, de mesures rigoureuses, lors même qu'il s'agit de formes larvées, torpides, prolongées de la tuberculose. Car il ne faut pas oublier que ces formes atténuées de l'infection bacillaire, les plus bénignes pour l'individu, qui peut longtemps survivre à ses atteintes et a toutes chances de ne pas mourir de sa tuberculose, sont fréquemment aussi les plus dangereuses pour son entourage, et les plus compromettantes pour l'avenir de sa descendance.

J'estime donc qu'en bonne logique les conseils du médecin et de l'hygiéniste doivent se résumer dans cette double proposition : *Célibataires pas de mariage ; Mariés pas d'enfants.*

Mais il y a, dira-t-on, maintes formes larvées, curables qui souvent guérissent : la présence de lésions tuberculeuses depuis longtemps guéries chez les deux tiers des sujets morts à un âge avancé en est la meilleure preuve. Faut-il donc à tous les sujets porteurs de telles lésions interdire le mariage ? Non certes, et pour cette excellente raison que nombre de ces lésions méconnues du malade, le sont généralement aussi du médicin. Mais aux malades atteints de lésions cliniquement appréciables, que leur évolution permet de préjuger curables et que l'on peut même au bout d'un certain temps considérer comme guéries, le médecin ne doit permettre le mariage qu'après une observation qu'il est nécessaire de prolonger si longtemps, qu'en fait cette longue expectation équivant presque à une interdiction absolue. C'est une mesure bien rigoureuse, il est vrai, mais que justifie le souci légitime de la protection d'une famille et celui de l'avenir de toute une descendance.

A NOTE BEARING ON THE STATISTICAL EVIDENCE OF THE EXTENT OF HEREDITY IN TUBERCULOSIS.

By J. EDWARD SQUIRE, M.D.,
Physician, North London Consumption Hospital.

In 1894, in a paper before the Royal Medical and Chirurgical Society of London, and three years later in the American Medical Journal (Nov., 1897), I gave reasons for considering that the influence of direct heredity in consumption is not so great as it was at that time believed to be. Although about 33 per cent. of consumptives present family history of tuberculosis, I showed statistical grounds for attributing the disease to occupation and surroundings in by far the greater number of these cases, and placed the possible influence of heredity at about 9 per cent. instead of at 33 per cent.

Within the last few weeks I have had occasion to look through a number of life insurance claims, and incidentally I have abstracted some figures bearing upon the influence of heredity in tuberculosis. Of 469 claims in which the required information was available, I find 78 deaths from consumption and other forms of tuberculosis. Of these 78, only 7 had any history of consumption in the family; 22 other cases in which death took place from causes other than tuberculosis gave phthisical histories. We have thus 440 cases free from consumptive taint, of whom 71 died of tuberculosis, 16·13 per cent.; and 29 cases with consumptive family history, of whom 7 died of tuberculosis, 24·13 per cent.

The excess in the percentage of deaths from tuberculosis in those with a consumptive family history over deaths from this disease in those without direct hereditary predisposition (viz., 8 per cent.), is curiously near to the figures (viz., 9 per cent.) which I arrived at in my Medico-Chirurgical paper to express the influence of heredity in tuberculosis.

The number of cases dealt with in this note is too small to be of much value by itself, but is interesting as tending to confirm the opinion, now very generally accepted, that the direct influence of heredity in tuberculosis is considerably less than was formerly supposed.

WET WINDS AND PHTHISIS.

By Dr. W. GORDON, *of Exeter.*

I had the honour last November of reading a paper before the Royal Medical and Chirurgical Society on "Wind Exposure and Phthisis," in which I endeavoured to show a relationship between the prevalence of phthisis and exposure to west and south-west winds in certain districts of Devonshire, viz.:—

St. Thomas Rural Sanitary District	during		2½	years.
Newton Abbot	"	"	15	"
Okehampton	"	"	10	"
Barnstaple	"	"	10	"

To my conclusions the following objections were raised:—

1. That the parish populations on which I based those conclusions were too small.
2. That the periods of observation were too short.
3. That I had not sufficiently carefully excluded the influence of racial differences.
4. Or of occupations, such as mining or lacemaking on the one hand, and such as sea fishing on the other.
5. Or of differences in closeness of intermarriage.
6. Or of differences in parish sanitation.
7. That I had not confined myself to the female death-rate from phthisis.

As well as the two following, which, however, are rather points of explanation than objection:—

8. That closing of doors and windows against the prevalent winds was the reason of the higher mortality in exposed places.
9. That prevalence alone accounted for the effect of these winds.

I would now venture to bring to your notice some further facts which may not be thought uninteresting, together with my reasons for believing that the foregoing objections can be reasonably shown inapplicable.

In order to examine the question more closely, I have had to limit myself to a single district, and I have chosen a district which seems specially suited to my purpose.

The rural district of Okehampton occupies the centre of the south-western peninsula of England, and all the winds which reach it from due W., S.W., S.E., E., N., and N.W., reach it from the sea over about an equal breadth of land. The north-east, which travels across the whole of England, is the only really land wind. The south is the one wind which practically does not reach it at all, being cut off by the whole width of the tableland of Dartmoor.

As regards exposure, the district is about the most generally exposed in Devon. Elevated at its southern extremity upon the north escarpment of

Dartmoor, it spreads northward over the northern spurs of the moor and the sheltered valleys they enclose, thus presenting to almost all winds except the south a number of marked contrasts between shelter and exposure.

The geological formation is exceptionally simple. Almost the whole district consists of carbonaceous shale, as shown in Map A.* The only exceptions are a narrow strip of red sandstone running into the district at the north-east, the Dartmoor granite occupying part of the south and south-east, and a very small amount of alluvium in the north, on which there are no dwellings.

The rainfall unfortunately cannot be stated so accurately as one could wish, owing to the paucity of observations, but by a comparison of the rainfall of the county it may be deduced with a tolerable degree of certainty. It is probably uniform across the district from west to east, but is heavier in the south than the north, being about 50 inches in the former and about 40 inches in the latter. If, however, the phthisis areas of Devon be compared with the distribution of rainfall, it will be found that the two do not correspond, and that a heavier rainfall by no means entails a heavier phthisis mortality.

TABLE A.

DESCRIPTIONS OF 103 OF THE CASES CONSIDERED (remainder unknown).

Daughter of farmer	19 cases.
Wife or widow of farmer	16 ,,
Daughter of labourer	13 ,,
Domestic servant	10 ,,
Wife or widow of labourer	9 ,,
Wife of tailor	3 ,,
Worker in wool factory	3 ,,
Wife of gardener	2 ,,
Daughter of blacksmith	2 ,,
Daughter of farm bailiff	2 ,,
Dressmaker	2 ,,
Housekeeper	2 ,,
Wife of sergeant	1 ,,
,, corn merchant	1 ,,
,, draper	1 ,,
,, station master	1 ,,
,, coal agent	1 ,,
,, thatcher	1 ,,
,, porter	1 ,,
,, miller	1 ,,
,, bootmaker	1 ,,
,, dentist	1 ,,
,, grocer	1 ,,
,, baker	1 ,,
Daughter of wheelwright	1 ,,
,, yeoman	1 ,,
,, butler	1 ,,
,, tailor	1 ,,
,, stonecutter	1 ,,
,, bootmaker	1 ,,
Foremaid in shop	1 ,,
Draper's assistant	1 ,,
	103

* The maps are not here reproduced.

In Barnstaple district, for example, Arlington parish, where no death from phthisis has occurred in ten years, has about the heaviest rainfall. This point was fully dwelt on in my previous paper.

The female population of the district may be said to be free from occupational phthisis, as will be seen from Table A. A woollen factory in North Tawton occupies many men, women, and children. But, as will be seen, it does not appear to have any important influence on the mortality from phthisis in its neighbourhood.

The medical officer of health for Okehampton, Dr. Young, informs me that there is no evident racial difference to be traced within the district, unless Mr. Baring-Gould is correct in supposing that the inhabitants of Germansweek are different from the rest.

Dr. Young says that intermarriage is not closer in one of his parishes than in another, with the exception of Beaworthy, where the people intermarry more closely than elsewhere; and that village and town sanitation is about the same all over the district.

I have confined my consideration to phthisis deaths amongst females. Thanks to Dr. Young, who most kindly supplied me with the information requisite, I have been able to consider these deaths with their causes in the separate parishes over a period of ten years. (See Table I.)

But it will doubtless be said that the period is too short and the figures too small. To these objections I would reply as follows:

Ten years was the period chosen by Sir George Buchanan in his well-known report on phthisis and dampness of soil, and it was the period chosen by Dr. Havilland in preparing his fine map of phthisis distribution in England. By taking a greater number of years one merely increases the risk of erroneous diagnoses—a risk inseparable in some degree from all considerations of this sort, but increasing as one goes back—and one tends to approach a period when local errors of sanitation probably produced greater local differences in mortality than now. Ten years seems a period which one may reasonably discuss, provided that the results arrived at are of such a sort as to suggest that they are not fortuitous.

As regards the small populations and small total number of deaths, at first sight the objection on this score seems insuperable, but a little consideration will show that the objection *does not really hold at all. If it can be shown, in a considerable number of small villages, in spite of the natural tendency of the small numbers of the populations to produce large exceptions to any law of incidence, that the law holds with almost no exception, then the conclusion to be drawn is, not that this absence of exception is itself a matter of chance, but that the law is so cogent that it overrides chance and compels conformity.* Such a law, I venture to suggest, is indicated by the maps and tables I am now going to lay before you.

Map I. shows the distribution of phthisis mortality amongst females in the parishes of Okehampton district. (The small white circular area in the centre of each map is the area of Okehampton urban district, and is not included in our consideration, which is confined to the more comparable country villages.)

TABLE I.—OKEHAMPTON RURAL DISTRICT.

Phthisis Deaths amongst Females in Ten Years, 1890–1899.

Dr. Young's Figures.

—	Female Population, 1891.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	Total Female Deaths, 1890–1899.	Rate per 1000 per annum.
North Tawton	927	4	2	2	1	1	..	1	1	..	..	12	1·3
Sampford Courtenay	429	3	..	3	2	..	..	3	..	..	..	11	2·5
Bondleigh	67	..	..	..	..	..	..	..	..	..	..	0	0
Bratton Clovelly	255	2	3	..	..	1	1	..	..	1	..	8	3·1
North Lew	364	..	1	1	2	1	2	..	..	1	2	10	2·7
Beaworthy	122	1	1	..	1	..	..	..	..	..	..	3	2·4
Highampton	135	..	..	2	..	..	..	..	1	2	..	5	3·7
Jacobstowe	113	..	..	1	..	..	1	..	..	..	..	2	1·7
Hatherleigh	724	..	..	..	2	1	1	1	..	1	..	6	·8
Inwardleigh	258	1	..	..	..	..	..	..	..	..	..	1	·4
Iddesleigh	197	2	..	..	..	..	..	..	..	1	..	3	1·5
Chagford	728	1	1	..	1	3	..	..	1	..	..	7	·9
Throwleigh	149	1	..	..	..	..	..	1	..	..	..	2	1·3
Sourton	217	2	1	..	3	..	1	..	..	..	1	8	3·6
South Tawton	633	..	2	..	..	..	..	2	2	1	2	9	1·4
Bridestowe	309	1	..	2	..	..	..	..	..	..	2	5	1·6
Drewsteignton	378	..	1	..	1	..	1	..	..	..	..	3	·8
Germansweek	102	..	1	..	1	..	..	..	1	..	1	4	3·9
Broadwood Kelly	132	..	1	..	..	..	..	..	..	..	..	1	·7
Exbourne	167	..	..	1	..	1	..	..	..	..	2	4	2·4
Belstone	89	..	..	..	..	..	..	..	..	1	..	1	1·1
Spreyton	193	..	..	..	..	1	1	..	..	1	..	3	1·5
Meeth	91	..	..	..	..	..	..	..	1	..	..	1	1·1
Ashbury	37	..	..	..	..	..	..	..	..	..	..	0	0
Gidleigh	57	..	..	..	..	..	..	..	..	..	..	0	0
Honeychurch	17	..	..	..	..	..	..	..	..	..	..	0	0
Monkokehampton	83	..	..	..	..	..	..	..	..	..	..	0	0
Okehampton (rural) about	300	..	1	..	..	2	..	1	..	..	..	4	about 1·3
Total Female Population	7273								Total Female Deaths			113	

The distribution of the mortality can evidently not be explained by the geology. Differences of race, occupation, sanitation, or intermarriage will not explain it. It may be taken that sanitation and purity of air are too uniform to affect it. Rainfall cannot explain it. Yet the differences are very marked.

Turning to wind exposures, I have made maps of the wind exposures of the parishes for each of the seven directions—south-west, west, north-west, north, north-east, east, and south-east—one for each wind, tinting the fully exposed parishes dark, and the partly sheltered parishes half dark, leaving the completely sheltered parishes white The finer distinctions are difficult to draw with absolute certainty in an intricately convoluted country; and as

TABLE II.

INFLUENCE OF EXPOSURE TO NORTH WIND.

Name of Parish.	Female Population, 1891.	Female Deaths from Phthisis in 10 years.	Female Phthisis Death-Rate per 1000 per annum.
I. Sheltered Parishes.			
North Tawton	927	12	1·3
Drewsteignton	378	3	·8
Bridestowe	309	5	1·6
Bratton Clovelly	255	8	3·1
Sourton	217	8	3·6
	2086	36	1·7 nearly.
II. Exposed Parishes.			
Highampton	135	5	3·7
Beaworthy	122	3	2·4
Hatherleigh	724	6	·8
North Lew	364	10	2·7
Jacobstowe	113	2	1·7
Exbourne	167	4	2·4
Sampford Courtenay	429	11	2·5
Spreyton	193	3	1·5
Belstone	89	1	1·1
South Tawton	633	9	1·4
Okehampton	300	4	1·3
Ashbury	37	0	0
Inwardleigh	258	1	·4
	3564	59	1·6
III. Imperfectly-Sheltered Parishes.			
Meeth	91	1	1·1
Iddesleigh	197	3	1·5
Monkokehampton	83	0	0
Broadwood Kelly	132	1	·7
Throwleigh	149	2	1.3
Gidleigh	57	0	0
Chagford	728	7	·9
Germansweek	102	4	3·9
Honeychurch	17	0	0
Bondleigh	67	0	0
	1623	18	1·1

partial shelter is the most difficult matter to assess, I would direct attention to complete exposures and complete shelters, which, at all events, can be depended upon. A coloured contour map, carefully studied parish by parish, for each wind separately, has been the means of comparison, and the method has been uniform for all the maps.

Taking these winds one by one—

Exposure to the *north wind* (Map II.) obviously will not explain the phthisis distribution, and this is confirmed by Table II.

The effect of the *north-east wind* (Map III.) is almost the reverse of what we should expect if it increased phthisis mortality. See also Table III.

TABLE III.

INFLUENCE OF EXPOSURE TO NORTH-EAST WIND.

Name of Parish.	Female population, 1891.	Female Deaths from Phthisis in 10 years.	Female Phthisis Death-Rate per 1000 per annum.
I. Sheltered Parishes.			
Iddesleigh	197	3	1·5
Hatherleigh	724	0	·8
Monkokehampton	83	0	0
North Tawton	927	12	1·3
Bridestowe	309	5	1·6
Bratton Clovelly	255	8	3·1
Germansweek	102	4	3·9
Honeychurch	17	0	0
	2614	38	1·4
II. Exposed Parishes.			
South Tawton	633	9	1·4
Spreyton	193	3	1·5
Chagford	728	7	·9
Gidleigh	57	0	0
Belstone	89	1	1·1
Okehampton	300	4	1·3
Ashbury	37	0	0
Inwardleigh	258	1	·4
Beaworthy	122	3	2·4
North Lew	364	10	2·7
Highampton	135	5	3·7
	2916	43	1·4
III. Imperfectly Sheltered Parishes.			
Meeth	91	1	1·1
Broadwood Kelly	132	1	·7
Jacobstowe	113	2	1·7
Exbourne	167	4	2·4
Sampford Courtenay	429	11	2·5
Drewsteignton	378	3	·8
Throwleigh	149	2	1·3
Sourton	217	8	3·6
Bondleigh	67	0	0
	1743	32	1·8

The *east and south-east winds* (Maps IV. and V.) are also seen to be incapable of explaining the phthisis distribution. (See Tables IV. and V.)

The map of exposure to the *south-west wind* (Map VI.), on the other hand, is strikingly like the map of phthisis mortality, and an examination of Table VI. brings out:—

(*a*) a remarkably higher mortality in exposed as compared with sheltered parishes;
(*b*) an intermediate position occupied by partly-sheltered parishes;
(*c*) the absence of marked exception.

TABLE IV.

Influence of Exposure to East Wind.

Name of Parish.	Female Population, 1891.	Female Deaths from Phthisis in 10 years.	Female Phthisis Death-Rate per 1000 per annum.
I. Sheltered Parishes.			
Hatherleigh	724	6	·8
Monkokehampton	83	0	0
Broadwood Kelly	132	1	·7
Okehampton	300	4	1·3
Honeychurch	17	0	0
Sampford Courtenay	429	11	2·5
Bridestowe	309	5	1·6
Sourton	217	8	3·6
	2211	35	1·5
II. Exposed Parishes.			
Highampton	135	5	3·7
Beaworthy	122	3	2·4
North Lew	364	10	2·7
Spreyton	193	3	1·5
South Tawton	633	9	1·4
Drewsteignton	378	3	·8
Throwleigh	149	2	1·3
Gidleigh	57	0	0
Belstone	89	1	1·1
	2120	36	1·7
III. Imperfectly-Sheltered Parishes.			
Meeth	91	1	1·1
Iddesleigh	197	3	1·5
Inwardleigh	258	1	·4
Jacobstowe	113	2	1·7
Exbourne	167	4	2·4
Bondleigh	67	0	0
North Tawton	926	12	1·3
Chagford	728	7	·9
Bratton Clovelly	253	8	3·1
Germansweek	102	4	3·9
Ashbury	37	0	0
	2942	42	1·4

Some variations need explanation :—

North Lew is fully exposed to the west wind.
Exbourne is partly exposed to west wind and fully to north-west.
Beaworthy is the least exposed of the parishes classed as exposed.
Sampford Courtenay stands high, and besides being fully exposed to the north-west, gets perhaps more south-west than its neighbours over the corner of Dartmoor.

TABLE V.

Influence of Exposure to South-East Wind.

Name of Parish.	Female Population, 1891.	Female Deaths from Phthisis in 10 years.	Female Phthisis Death-Rate per 1000 per annum.
I. Sheltered Parishes.			
Bridestowe	309	5	1·6
Sourton	217	8	3·6
Okehampton	300	4	1·3
Ashbury	37	0	0
North Lew	364	10	2·7
Hatherleigh	724	6	·8
Monkokehampton	83	0	0
Inwardleigh	258	1	·4
Jacobstowe	113	2	1·7
Exbourne	167	4	2·4
Honeychurch	17	0	0
Bondleigh	67	0	0
Sampford Courtenay	429	11	2·5
South Tawton	633	9	1·4
Drewsteignton	378	3	·8
Chagford	728	7	·9
Gidleigh	57	0	0
Throwleigh	149	2	1·3
Belstone	89	1	1·1
	5119	73	1·4
II. Exposed Parish.			
Spreyton	193	3	1·5
III. Imperfectly Sheltered Parishes.			
Germansweek	102	4	3·9
Bratton Clovelly	255	8	3·1
Beaworthy	122	3	2·4
Highampton	135	5	3·7
Meeth	91	1	1·1
Broadwood Kelly	132	1	·7
Iddesleigh	197	3	1·5
North Tawton	927	12	1·3
	1961	37	1·8

The *west wind* (Map VII.) also suggests strikingly a connection between exposure and phthisis, though not so strikingly as in the case of the south-west wind, and Table VII. brings this out clearly.

Broadwood Kelly and Spreyton only get the wind after its force has been broken, and perhaps one is scarcely right in calling these fully exposed. However, as there is a doubt, one has felt it better to decide against one's own inclination.

Germansweek is fully exposed to the south-west wind.

TABLE VI.

Influence of Exposure to South-West Wind.

Name of Parish.	Female Population, 1891.	Female Deaths from Phthisis in 10 years.	Female Phthisis Death-Rate per 1000 per annum.
I. Sheltered Parishes.			
Chagford	728	7	·9
Gidleigh	57	0	0
Throwleigh	149	2	1·3
Drewsteignton	378	3	·8
South Tawton	633	9	1·4
Okehampton	300	4	1·3
Belstone	89	1	1·1
Jacobstowe	113	2	1·7
Exbourne	167	4	2·4
Inwardleigh	258	1	·4
North Lew	364	10	2·7
Ashbury	37	0	0
Hatherleigh	724	6	·8
Monkokehampton	83	0	0
	4080	49	1·2
II. Exposed Parishes.			
Highampton	135	5	3·7
Beaworthy	122	3	2·4
Germansweek	102	4	3·9
Bratton Clovelly	255	8	3·1
Sourton	217	8	3·6
	831	28	3·3
III. Imperfectly-Sheltered Parishes.			
Spreyton	193	3	1·5
Sampford Courtenay	429	11	2·5
North Tawton	927	12	1·3
Bondleigh	67	0	0
Honeychurch	17	0	0
Broadwood Kelly	132	1	·7
Iddesleigh	197	3	1·5
Meeth	91	1	1·1
Bridestowe	309	5	1·6
	2362	36	1·5

Considering *south-west and west winds together*, Table VIII. brings out the following remarkable facts:—

(i.) That the mortality in the parishes fully exposed to both west and south-west winds is uniformally high—usually very high—whilst the mortality in the parishes fully sheltered from both is uniformly low—usually very low.

(ii.) That the average mortality in the exposed parishes is nearly five times as great as that in the sheltered parishes.

TABLE VII.

Influence of Exposure to West Wind.

Name of Parish.	Female Population, 1891.	Female Deaths from Phthisis in 10 years.	Female Phthisis Death-Rate per 1000 per annum
I. Sheltered Parishes.			
Ashbury	37	0	0
Monkokehampton	83	0	0
Drewsteignton	378	3	·8
Throwleigh	149	2	1·3
Gidleigh	57	0	0
Chagford	728	7	·9
Inwardleigh	258	1	·4
	1690	14	·8
II. Exposed Parishes.			
Bratton Clovelly	255	8	3·1
Beaworthy	122	3	2·4
Highampton	135	5	3·7
North Lew	364	10	2·7
Broadwood Kelly	132	1	·7
Spreyton	193	3	1·5
Sourton	217	8	3·6
	1418	38	2·6
III. Imperfectly-Sheltered Parishes.			
Bridestowe	309	5	1·6
Germansweek	102	4	3·9
Hatherleigh	724	6	·8
Meeth	91	1	1·1
Iddesleigh	197	3	1·5
North Tawton	927	12	1·3
Honeychurch	17	0	0
Sampford Courtenay	429	11	2·5
South Tawton	633	9	1·4
Belstone	89	1	1·1
Jacobstowe	113	2	1·7
Exbourne	167	4	2·4
Bondleigh	67	0	0
Okehampton	300	4	1·3
	4165	62	1·4

The *north-west* wind looks doubtful on the map (IX.), but Table IX. indicates that it has some amount of effect. This effect is by no means so marked as that of the west and south-west winds, but it perhaps accounts in part for the death-rates in Sampford Courtenay and Exbourne.

From these maps and tables I draw the conclusion that my former view was correct, viz., that mortality from phthisis in Devon is largely determined by exposure to or shelter from west and south-west winds.

And this brings us to the two last objections, if such they should be called.

Those who know Devonshire will agree in saying that most cottage windows are usually never opened at all, and that the doors can scarcely be believed to be more often closed in south-west or west winds than in strong winds from any quarter; it will scarcely be supposed that the doors are always on the west or south-west side of the houses. This contention, however, is a matter of explanation merely, and does not affect the *fact* of the influence of the wind-exposure of a district on the phthisis death-rate.

As regards the suggestion that prevalence is the one factor determining the effect of these winds, this is based on an exaggerated idea of their prevalence. If we consider the figures given for various stations in Devon in the Royal Medical and Chirurgical Society's work on the "Climates and Baths of Great Britain," we shall deal liberally by the west and south-west winds in assigning to them together one-third of the total windy days of the year.

Moreover, a comparison of other countries does not bear out the view that

TABLE VIII.

Influence of Exposure to West and South-West Winds.

Name of Parish.	Female Population, 1891.	Female Deaths from Phthisis in 10 years.	Female Phthisis Death-Rate per 1000 per annum.
I. Sheltered Parishes from both.			
Inwardleigh	258	1	·4
Monkokehampton	83	0	0
Chagford	728	7	·9
Gidleigh	57	0	0
Throwleigh	149	2	1·3
Drewsteignton	378	3	·8
Ashbury	37	0	0
	1690	13	·7
II. Exposed to both.			
Highampton	135	5	3·7
Beaworthy	122	3	2·4
Bratton Clovelly	255	8	3·1
Sourton	217	8	3·6
	729	24	3·3 nearly.

wind as wind alone is deleterious. Colorado Springs, so beneficial in phthisis and so free from phthisis amongst residents, is a decidedly windy place. But I think it will be found in comparing climates that places exposed to strong wet winds are uniformly bad for phthisis, and we may, I believe, consider

TABLE IX.

INFLUENCE OF EXPOSURE TO NORTH-WEST WIND.

Name of Parish.	Female Population, 1891.	Female Deaths from Phthisis in 10 years.	Female Phthisis Death-Rate per 1000 per annum.
I. Sheltered Parishes.			
Bondleigh	67	0	0
Drewsteignton	378	3	·8
Throwleigh	149	2	1·3
Gidleigh	57	0	0
	651	5	·7
II. Exposed Parishes.			
Hatherleigh	724	6	·8
Highampton	135	5	3·7
North Lew	364	10	2·7
Beaworthy	122	3	2·4
Inwardleigh	258	1	·4
Jacobstowe	113	2	1·7
Exbourne	167	4	2·4
Sampford Courtenay	429	11	2·5
Spreyton	193	3	1·5
Monkokehampton	83	0	0
Okehampton	300	4	1·3
Sourton	217	8	3·6
	3105	57	1·8
III. Imperfectly-Sheltered Parishes.			
Meeth	91	1	1·1
Iddesleigh	197	3	1·5
Honeychurch	17	0	0
North Tawton	927	12	1·3
South Tawton	633	9	1·4
Belstone	89	1	1·1
Chagford	728	7	·9
Germansweek	102	4	3·9
Bratton Clovelly	255	8	3·1
Bridestowe	309	5	1·6
Broadwood Kelly	132	1	·7
Ashbury	37	0	0
	3517	41	1·1

strength and wetness of wind as important as their prevalence. Personally, I think wetness is the worst quality of the three.

I must not conclude without expressing my great sense of indebtedness to Dr. Young for the immense help he has given me in the preparation of my materials, help without which this paper could not have come into existence.

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